Water Resources Survey

Part I:
HISTORY OF LAND AND WATER USE ON IRRIGATED AREAS

and

Part II:
MAPS SHOWING IRRIGATED AREAS IN COLORS DESIGNATING THE SOURCES OF SUPPLY

Granite County, Montana

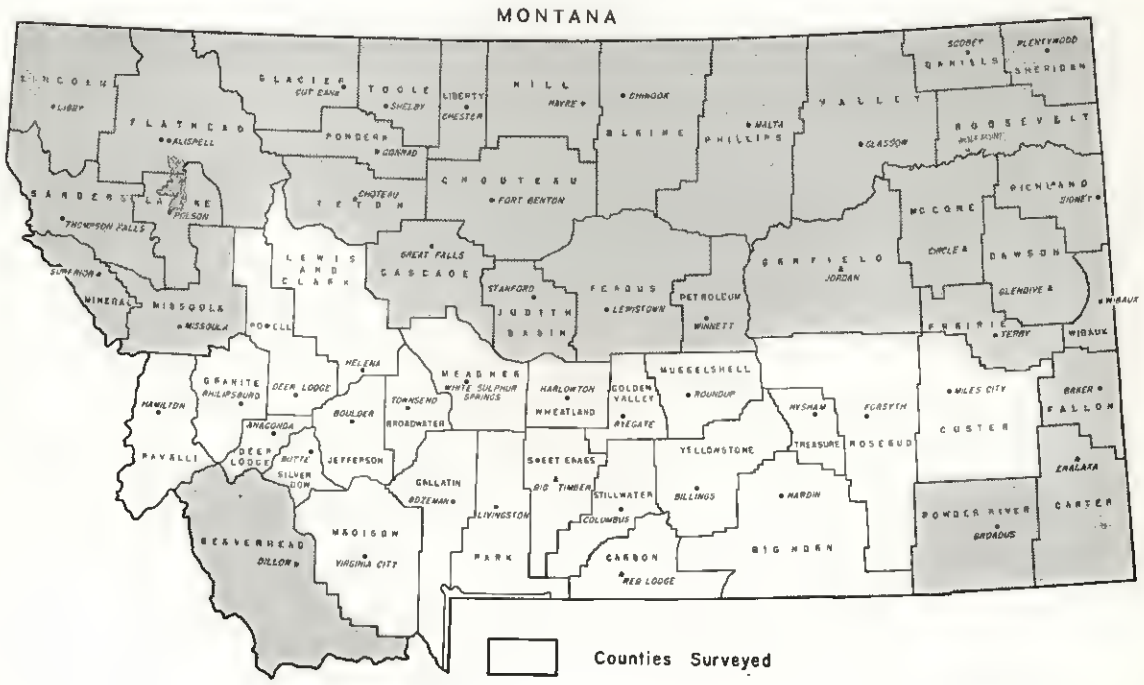
Published by
STATE ENGINEER'S OFFICE
Helena, Montana, June, 1959

WATER RESOURCES SURVEY

GRANITE COUNTY MONTANA

Part I

History of Land and Water Use
on Irrigated Areas



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WESTERN LITHO-PRINT, INC., BILLINGS, MONTANA

June, 1959

Honorable J. Hugo Aronson
Governor of Montana
Capitol Building
Helena, Montana

Dear Governor Aronson:

Submitted herewith is a consolidated report on the Water Resources Survey of Granite County, Montana.

This work is being carried on with funds made available to the State Engineer by the 35th Legislative Session, 1957, and in cooperation with the State Water Conservation Board and the Montana State Agricultural Experiment Station.

The report is divided into two parts. Part I consists of history of land and water use, irrigated lands, water rights, etc., and Part II contains the township maps in the county showing in color the lands irrigated from each source or canal system.

Work has been completed and reports are now available for the following counties: Big Horn, Broadwater, Carbon, Custer, Deer Lodge, Gallatin, Golden Valley, **Granite,** Jefferson, Lewis and Clark, Madison, Meagher, Musselshell, Park, Powell, Ravalli, Rosebud, Silver Bow, Stillwater, Sweet Grass, Treasure, Wheatland and Yellowstone.

The office files contain minute descriptions and details of each individual water right and land use, which are too voluminous to be included herein. These office files are available for inspection to those who are interested.

The historical data on water rights contained in this report can never become obsolete. If new information is added from time to time as new developments occur, the records can always be kept current and up to date.

Respectfully submitted,
FRED E. BUCK, State Engineer

ACKNOWLEDGMENTS

A survey and study of water resources involves many phases of both field and office work in order to gather the necessary data to make the information complete and comprehensive. Appreciation of the splendid cooperation of various agencies and individuals who gave their time and assistance in aiding us in gathering the data for the preparation of this report is hereby acknowledged.

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Mrs. S. M. Puyear, Clerk of the District Court
Mrs. A. M. McDonald, Clerk and Recorder — Roy M. Greenheck, Assessor

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Walter Allen ..... State Supt. of Fisheries
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Regional Forester ..... U. S. Dept. of Agriculture, Forest Service
Jobe Miller ..... Secretary, Allendale Irrigation Company
Loyd Weidman
Secretary ... Flint Creek Project (Flint Creek Water Users' Association)

The State Engineer's Office, Water Resources Survey, hereby expresses sincere appreciation to the many ranchers, farmers and stockmen who have given their helpful cooperation in this survey.

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FOREWORD

MONTANA'S WATER RIGHT PROBLEMS

Our concern over surface water rights in Montana is nearly a century old. When the first Territorial Legislature, meeting in Bannack, adopted the common law of England on January 11, 1865, the Territory's legal profession assumed that it had adopted the Doctrine of Riparian Rights. This doctrine had evolved in England and in eastern United States where the annual rainfall is generally more than twenty inches. It gave the owners of land bordering a stream the right to have that stream flow past their land undiminished in quantity and unaltered in quality and to use it for household and livestock purposes. Since the law restricted the use of the water to riparian owners and forbade them to reduce appreciably the stream flow, the early miners and ranchers in Montana favored the Doctrine of Prior Appropriation which permitted diversion and diminution of the streams. Consequently, the next day the legislature enacted a law which permitted diversion by both riparian and non-riparian owners. Whether or not this action provided Montana with one or two definitions of water rights was not settled until 1921 when the Montana Supreme Court in the Mettler vs. Ames Realty Co. case declared the Doctrine of Prior Appropriation to be the valid Montana water right law. "Our conclusion," it said, "is that the common law doctrine of riparian rights has never prevailed in Montana since the enactment of the Bannack Statutes in 1865 and that it is unsuited to the conditions here . . ."

The appropriation right which originated in California was used by the forty-niners to divert water from the streams to placer mine gold. They applied to the water the same rules that they applied to their mining claims—first in time, first in right and limitation of the right by beneficial use. Those who came to the Montana gulches applied these rules to agriculture as well as to mining.

The main points of consideration under the Doctrine of Prior Appropriations are:

1. The use of water may be acquired by both riparian and non-riparian landowners.

2. It allows diversion of water regardless of the reduction of the water supply in the stream.

3. The value of the right is determined by the priority of the appropriation; i.e., first in time is first in right.

4. The right is limited to the use of the water. Stream waters in Montana are the property of the State and the appropriator acquires only a right to their use. Moreover, this use must be beneficial.

5. A right to the use of water is considered property only in the sense that it can be bought or sold; its owner may not be deprived of it except by due process of law.

The State Legislature has provided methods for the acquisition, determination of priority and administration of the right. No right may be acquired on a stream without diversion

of water and its application to a beneficial use. On unadjudicated streams, the Statutes stipulate that the diversion must be preceded by posting a notice at a point of intended diversion and by filing a copy of it within 20 days in the County Clerk's Office of the county in which the appropriation is being made. Construction of the means of diversion must begin within 40 days of the posting and continue with reasonable diligence to completion. However, the Montana Supreme Court has ruled that an appropriator who fails to comply with the Statutes may still acquire a right merely by digging a ditch and putting the water to beneficial use.

To obtain a water right on an adjudicated stream, one must petition the District Court having jurisdiction over that stream for permission to make an appropriation. If the other appropriators do not object, the court gives its consent and issues a supplementary decree granting the right subject to the rights of the prior appropriators.

Inasmuch as the Montana laws do not require water users to file official records of the completion of their appropriations, it becomes advisable as soon as the demand for the waters of a stream becomes greater than its supply, to determine the rights and priorities of each user by means of an adjudication or water right suit. This action may be initiated by one or more of the appropriators who may make all the other claimants parties to the suit. Thereupon the Judge of the District Court examines the claims of all the claimants and issues a decree establishing priority of the right of each water user and the amount of water he is entitled to use. The court decree becomes in effect the deed of the appropriator to his water right.

Whenever scarcity of water in an adjudicated stream requires an allocation of the supply according to the priority of rights, the Judge, upon petition of the owners of at least 15 per cent of the water rights affected, must appoint a water commissioner to distribute the water. After the Commissioner has been appointed the Judge gives him full instructions on how the water is to be apportioned and distributed in accordance with the terms of the decree.

The recordings of appropriations in local courthouses provides an incomplete record of the water rights on unadjudicated streams. In fact, the county records often bear little relation to the existing situation. Since the law places no restriction on the number and extent of the filings which may be made on an unadjudicated stream, the total amount of water claimed is frequently many times the available flow. There are numerous examples of streams becoming over appropriated. Once six appropriators each claimed all of the water in Lyman Creek near Bozeman. Before the adjudication of claims to the waters of Prickly Pear Creek, 68 parties claimed thirty times its average flow of 50 cfs. Today, the Big Hole River with an average flow of 1,129 cfs has filings totaling 173,912 cfs. A person is unable to distinguish in the county courthouses the perfected rights from the unperfected ones since the law requires no official recordation of the completion of an appropriation. Recognition by the courts of unrecorded appropriations adds to the incompleteness of these records. To further complicate the situation, appropriators have used different names for the same stream in their filings. In Montana many of the streams flow through several counties; consequently, water right filings on these inter-county streams are found distributed in two or more county courthouses. Anyone desirous of determining appropriations on a cer-

tain river or creek finds it difficult and expensive to examine records in several places. In addition, the records are sometimes scattered because the original nine counties of 1865 have now increased to 56. As the original counties have been divided and sub-divided, the water right filings have frequently not been transcribed from the records of one county to the other. Thus, a record of an early appropriation in what is at present Powell County may be found in the courthouse of the original Deer Lodge County.

It can be readily seen that this system of recording offers little protection to rights in the use of water until they are determined by an adjudication. In other words, an appropriator does not gain a clear title to his water right until after adjudication and then the title may not be clear because the Montana system of determining rights is also faulty. In the first place, adjudications are costly, sometimes very costly when they are prolonged for years. It is estimated that litigation over the Beaverhead River, which has lasted more than twenty years, has cost the residents of the valley nearly a half a million dollars. In the second place, unless the court seeks the advice of a competent irrigation engineer, the adjudication may be based upon inaccurate evidence. In the third place, if some claimant has been inadvertently left out of the action, it is not final and may be reopened for consideration by the aggrieved party. Another difficulty arises in determining the ownership of a water right when land under an adjudicated stream becomes sub-divided in later years and the water not proportioned to the land by deed or otherwise. There is no provision made by law requiring the recording of specific water right ownership on deeds and abstracts.

The Legislative Session of 1957 passed Chapter 114 providing for the policing of water released from storage to be transmitted through a natural stream bed to the place of use. The owner of the storage must petition the court for the right to have the water policed from the storage reservoir to his place of use. If there are no objections, the court may issue this right and appoint a water commissioner to distribute the water in accordance therewith. This law applies only to unadjudicated streams.

Administration of water on an adjudicated stream is done by the District Court, but it has its drawbacks. The appointment of a water commissioner is often delayed until the shortage of water is acute and the court frequently finds it difficult to obtain a competent man for a position so temporary. The present administration of adjudicated streams which cross the county boundaries of judicial districts creates problems. Many of the water decrees stipulate head gates and measuring devices for proper water distribution, but in many instances the stipulation is not enforced, causing disagreement among the water users.

Since a water right is considered property and may be bought and sold, the nature of water requires certain limitations in its use. One of the major faults affecting a stream after an adjudication is the failure of the District Court to have some definite control over the transfer of water rights from their designated places of use. The sale and leasing of water is becoming a common practice on many adjudicated streams and has created serious complications. By changing the water use to a different location, many of the remaining rights along the stream are disrupted resulting in a complete breakdown of the purpose intended by the adjudication. To correct this situation, legal action must be initiated by the injured parties as it is their responsibility and not the Court's.

At one time or another all of the other Western Reclamation States have used similar methods of local regulation of water rights. Now all of them except Montana have more or less abandoned these practices and replaced them by a system of centralized state control such as the one adopted by the State of Wyoming. The key characteristics of the Wyoming system are the registration of both the initiation and completion of an appropriation in the State Engineer's Office, the determination of rights and administration by a State Board of Control headed by the State Engineer. These methods give the Wyoming water users titles to the use of water as definite and defensible as those which they have to their land.

When Montana began to negotiate the Yellowstone River Compact with Wyoming and North Dakota in 1939, the need for some definite information concerning our water and its use became apparent. The Legislature in 1939 passed a bill (Ch. 185) authorizing the collection of data pertaining to our uses of water and it is under this authority that the Water Resources Survey is being carried on. The purpose of this survey is six fold: (1) to catalogue by counties, in the office of the State Engineer, all recorded, appropriated and decreed water rights including use rights as they are found; (2) to map the lands upon which the water is being used; (3) to provide the public with pertinent water right information on any stream, thereby assisting them in any transaction where water is involved; (4) to help State and Federal agencies in pertinent matters; (5) to eliminate unnecessary court action in water right disputes; (6) and to have a complete inventory of our perfected water rights in case we need to defend these rights against the enroachments of lower states.

Ground water and surface water are intimately related. In fact, it is difficult to consider one without the other. In times of heavy precipitation and surface runoff, water seeps below the land surface to recharge underground reservoirs which, in turn, discharge ground water to streams and maintain their flow during dry seasons. The amount of water stored underground is far greater at any given instant than the amount of surface water in Montana, and, without seepage from underground sources, it is probable that nearly all the streams in the State would cease to flow during the dry seasons.

It is believed that Montana's ground water resource is vast and only partly developed. Yet this resource is now undergoing a rapidly accelerating development as the need for its use increases and economical energy for pumping becomes available. Continued rapid development will undoubtedly cause waste and depletion of ground water in areas where it is not plentiful. Experience in other states has shown that once overuse of ground water in a specific area has started, it is nearly impossible to stop, and may result in painful economic readjustments for the inhabitants of the area concerned.

Practical steps aimed at conserving ground water resources and correcting related deficiencies in surface water laws are necessary in Montana. Proposed ground water codes have been rejected by four sessions of the Montana Legislative Assembly, (1951, 1953, 1955, 1959) and proposed improvements of existing surface water laws have also failed to be enacted. The formulation and presentation of a workable ground water code, designed to protect and conserve Montana's ground water resources, to the next Legislature are essential if Montana is to avoid the problems that plague some of our sister states.

A ground water code must be based on full consideration of the intimate relation of ground water and surface water. A central filing office where all filings, well logs, and other records (past, present, and future) for all water in use—ground or surface—should be provided for by any water code. Accurate records concerning water rights and amount of water available are essential in the administration and investigation of water resources. The availability of these records in a central office under the control of a responsible State agency will surely provide a stronger and more accurate basis for the negotiation of interstate water compacts, as well as set up a means for rapid evaluation of data for in-State litigation.

METHOD OF SURVEY

Water Resources data contained in Part I and Part II of this report are obtained from courthouse records in conjunction with individual contacts of land ownership. A survey of this type involves extensive detailed work in both the office and field to compile a comprehensive inventory of water rights as they apply to land and other uses.

The material of foremost importance used in conducting the survey is as follows: From the files of the county courthouse the data required includes; land ownership, water right records (decrees and appropriations), articles of incorporation of ditch companies and any other legal papers in regard to the distribution and use of water. Deed records of land ownership are reviewed and abstracts are checked for water right information when available.

Aerial photography is used by the survey to assure accuracy in mapping the land areas of water use and all the other detailed information which appears on the final colored township maps in Part II of the reports. Section and township locations are determined by the photogrammetric system, based on government land office survey plats, plane-table surveys, county maps and by "on the spot" location during the field survey. Noted on the photographs are the locations of each irrigation system, with the irrigated and irrigable land areas defined. All the information compiled on the aerial photo is transferred and drawn onto a final base map by the means of aerial projection. From the base map color separation maps are made and may include three to ten over-lay separation plates, depending on the number of irrigation systems within the township.

Field forms are prepared for each land owner, showing the name of the owner and operator, photo index number, a plat defining the ownership boundary, type of irrigation system and source of water supply and total acreage irrigated and irrigable under each. All of the appropriated and decreed water rights that apply to each ownership by the description of intended place of use are listed on the field form. During the field survey, all water rights listed on the field form are verified with the land owner. Whenever any doubt or complication exists in the use of a water right, deed records of the land are checked to determine the absolute right of use.

So far as known, this is the first survey of its kind ever attempted in the United States. The value of the work has become well substantiated in the counties completed to date by giving Montana its first accurate and verified information concerning its water rights and their use. New development of land for irrigation purposes by State and Federal agencies is not within the scope of this report. The facts presented are as found at the time of completing each survey and provide the items and figures from which a detailed analysis of water and land use can be made.

The historical data contained in these reports can never become obsolete. If new information is added from time to time as new developments occur, the records can always be kept current and up-to-date.

GENERAL INFORMATION

Granite County was created by an act of the Legislature on March 2, 1893. It was formerly a part of Deer Lodge County and at the time of its creation, Phillipsburg was designated as the county seat.

Like other western pioneer communities, settlers in the county suffered from the hostilities of Indians and at the time of the Nez Perce outbreak some prospectors were killed by Chief Joseph's followers.

From its early existence, mining has played an important part in the settlement and development of the area. One of the most important mining camps in Montana was the Flint Creek Mining District which inclosed the famous Granite Mountain ledge. It comprised an area of mineral land 15 miles square, situated on the western exposure of the Granite Range, near the head of the Flint Creek Valley. This property was originally located in the autumn of 1872 and the claim became known as the Granite Mountain Lode by Messrs, James W. Estil, Eli D. Hall, and Josiah M. Merrill. One of the first early day prospectors and settlers was Joe Henderson, who in the year of 1864 discovered a rich gold deposit at a place that is now called Henderson Gulch. In later years this same deposit was reopened by a mining corporation and during the war years became recognized in importance for the extraction of manganese ore. Henderson Gulch is located at the foot of a superfluous flint deposit from which the Indians named the Flint Creek Valley. Indians came from many miles around to obtain the flint to make arrowheads.

Up until this time the sole purpose of immigration to the Flint Creek Valley was for such mineral resources as gold and flint. No heed was ever taken of the rich and fertile valley near mountains where these minerals were found. The current occupation of the valley is ranching and diversified farming, while the primary occupation was based entirely upon mining interests. An interesting comparison between the two trends is noted in the towns now remaining and those which were abandoned long ago. Bear Gulch, Reynolds City, and Princeton, at one time the leading mining cities of the area, are now ghost towns, while New Chicago, Drummond, and Hall founded in the main agricultural areas are still in existence.

One of the early day settlers who realized the potential productiveness of the land was George Metcalf, a Utah settler of 1857. He was associated in the erection of the first Anaconda smelter and soon after came to Phillipsburg where he purchased an old homestead near there. His ranch has been built up to be one of the most modern and outstanding in the valley.

Joe Henderson, who, after making his money in gold mining from Henderson Gulch, homesteaded an acreage in 1871. After his death, his sons Jesse and George possessed this land and now their sons own and operate this former land plot built up to its present 4,000 acres of beauty. The ranch is now called Henderson Brothers Ranch and was the first in that vicinity to raise and breed Black Polled Angus cattle. Their present herd is now composed of 700 head.

The principal towns of importance within the county are Phillipsburg, Drummond, Hall, Maxville, Bearmouth, and New Chicago. Phillipsburg, the county seat, is the largest community in the county and was named after Philip Deidsheimer, a noted mining man in 1865. Its present day population is about 1,400 people and is located almost centrally in the county along the foot of a spur of the Rocky Mountain Range in what was once the heart of the mining district. Drummond was first settled in 1883 on the old "Mullan Trail" and along the banks of the Clark Fork River. The first settlers in this community were George Hanson and his wife in 1881, who came by ox team from Iowa and lived in their covered wagon for 3 months until they could build a cabin. Drummond was named after a thoroughbred stallion owned by C. Edwards in 1883. Hall, a picturesque little town in the southern part of the county, has existed through the years in the rich agricultural area of the Flint Creek Valley. Maxville, a small community was named after MackVille J. McLeod, a surveyor and one of the oldest residents of the town. Bearmouth, one of the older communities, is located on the railroads of the Northern Pacific and the Chicago, Milwaukee, St. Paul and Pacific and so named because it is at the mouth of Bear Gulch. It was at one time the scene of several train robberies and the rough character of the surrounding country provided a refuge for the outlaws, making pursuit and capture by posses extremely difficult. New Chicago is located in the heart of an agricultural area at the southern end of the Flint Creek Valley. It was founded on July 4, 1872 by John A. Featherman on what was the old stage road between Deer Lodge and Missoula.

During the boom days of the silver mines at Phillipsburg the influx of population required more agricultural projects than the Flint Creek Valley was producing at that time. The Bitterroot Valley was the nearest source of supply but it was necessary to make the long wagon haul through Missoula, Drummond and up to Phillipsburg. Consequently, the people of Phillipsburg and the Bitterroot Valley built a road across the Ruby Mountains from Burnt Fork Creek in Ravalli County to Rock Creek in Granite County, and on over to Phillipsburg. The road was constructed sometime during the 1880's but was no longer used after the crash in the price of silver. This road was called the "Bitterroot Direct".

The general topography of Granite County is mountainous, with valleys in between the mountain ranges. The eastern half is made up of the Flint Creek Valley and drained by Flint Creek and its tributaries, which empty into the Clark Fork at Drummond in the northern part of the county. The western half is composed of the Rock Creek Valley and is drained by Rock Creek and its many branches of mountain streams. Rock Creek flows north through a deep canyon 50 miles long to join the Clark Fork River about 30 miles west of Drummond. The agricultural lands range in elevations from 4,000 feet to 6,000 feet in the high mountain meadows.

The county has had a colorful history of mining and agriculture, with agriculture having predominance today. Some of the crops which are grown include spring wheat, oats, barley, and hay. According to the 1958 Montana Agricultural Statistics, there were 29,200 cattle in the county, with some sheep, milk cows, and swine. There are also some purebred Hereford breeders who are raising very fine quality cattle.

Mining still plays an important part as an industry in the area around Phillipsburg with manganese, silver, lead, and zinc mined and milled near the town.

Transportation facilities in the county are adequate, with railway, highway, bus, and air travel connections comparable to some of the other counties in the State.

Two main line railroads enter the northern part of the county from east to west. These are the Northern Pacific Railway and the Chicago, Milwaukee, St. Paul and Pacific Railroad, which enter the county a mile and a half west of the railroad siding of Jens, in Powell County. These railroads are parallel to each other, following closely the water level route of the Clark Fork River and they leave the county just east of the railroad siding of Nimrod, in Missoula County. A branch line of the Northern Pacific Railway starts at Drummond, and courses southerly up the Flint Creek Valley to the town of Phillipsburg.

U. S. Highway 10 crosses the county from east to west and follows almost the same route as the railroads, running parallel with them. The alternate U. S. Highway 10A from the junction west of Butte to Anaconda, enters Granite County from the south near Georgetown Lake and follows a route north through the towns of Phillipsburg, Maxville, and Hall connecting with U. S. Highway 10 at Drummond. In addition to the main highways, the county is well supplied with improved gravel roads. One road which should be mentioned, is State Highway 38, which branches from Highway 10A at Porters Corner, 7 miles south of Phillipsburg, and follows a westerly direction across the county over the Skalkaho Creek Divide into Ravalli County, where it connects with U. S. Highway 93 at Grantsdale. This road is used only during the summer months as a scenic route and a short-cut from Butte to the Bitterroot Valley.

Bus connections for passenger travel into and out of the county are by the Northland Greyhound Bus Lines. Local motor freight lines from Missoula and Butte make deliveries of freight to the towns and small communities in the area.

The nearest airport facilities for residents in the county are located at Missoula and Butte.

According to the last census in 1950, Granite County had a population of 2,773 people, placing it 46th among the 56 counties in the State. The county ranks 39th in area, with a total of 1,733 square miles.

CLIMATE

Granite is another of Montana's mountainous western counties, with wide variations in weather and climate between valleys and higher elevations. The principal valleys are: Clark Fork, Flint Creek and Rock Creek. Clark Fork River flows westward across the northern part of the county; Flint Creek rises near the southeast corner of the county, flows northward and empties into Clark Fork River near Drummond; and Rock Creek, which rises along the Continental Divide, flows northward along the western boundary of the county, emptying into Clark Fork River near the northwest corner of the county. Aside from these major drainages and their well-defined valleys which have their unique effects on climate, perhaps the main topographic features are the Sapphire Range on the western border, the Flint Creek Range east of Phillipsburg, the John Long Mountains between Flint and Rock Creeks, and the Garnet Range on the north, although all mountain areas have some effect. As usual in Montana mountainous areas, the higher elevations are in general wetter than the valley bottoms.

Elevations range from over 10,000 feet above sea-level along the Anaconda Range section of the Continental Divide on the southern border, down to about 3,500 feet where the Clark Fork River leaves the county at the northwest corner. Being one of the most mountainous of Montana's counties, with major ranges running in all directions, climatic variations are large, and the few stations that have maintained records for the Weather Bureau over the years cannot represent much of the area except in a very general sense. The effects of terrain generally higher in the south half of the county and to the west are such as to cause lower average precipitation in the north half, resulting from downslope flow of the prevailing southwesterly winds over this area of the United States.

While valley precipitation varies markedly with the season each year (wet spring, dry summer and fall), mountain precipitation is fairly steady from month to month. Mountain snowfall is rather heavy, and snowpacks during each winter accumulate sufficient moisture to produce heavy runoff each spring whether or not the usual spring rains occur. Valley precipitation averages much less, ranging downward to annual totals of about 12 inches at Drummond and along the Clark Fork River. May and June are the wettest months at both Drummond and Phillipsburg, and well over half the year's precipitation, in agricutural areas, falls during the growing season. In this characteristic, as well as others, Granite County climate is more similar to that of areas in the Missoula headwaters area above Three Forks than to areas to the west and north, west of the Continental Divide.

There is more sunshine in Granite County than to the west and north, and summers are characterized by mostly clear and not too warm days. Summer afternoons often have "thunderheads", but mostly over mountain areas, and thunderstorms are seldom severe. Cloudiness increases in general in the late fall, but lower elevation precipitation actually decreases through the winter until spring storm activity arrives. In the mountains, however, winter precipitation usually is heavy. Winters are cold, and sometimes quite low extremes are observed in the valley bottoms and level country along the Clark Fork River near Drummond—as low as —42° at Drummond on one occasion in 1933. Summertime high temperatures, on the other hand, rarely are oppressive, and have reached 100° only once at Drummond and never at Phillipsburg. Because of its high average elevation, the county

averages rather cold, as the figures for Phillipsburg and Drummond shown below indicate. The freeze-free period of the year averages only 55 days at Phillipsburg. During the winter an occasional "blizzard" condition will develop along the northern river bottoms, the wind generally from the east; however, occasional winters will pass without this condition having occurred. Tornadoes are unknown in this area, and extremely high winds (75 mph or more) are very rare.

Weather stations in Granite County that have fairly long records are limited to two: Drummond and Phillipsburg, although there is a long precipitation record for Silver Lake, just over the Deer Lodge County border near Georgetown Lake. A recent record for Garnet has been rather incomplete, but does show much higher precipitation than either Drummond or Phillipsburg—an annual average perhaps as much as 25 inches or more. A tabulation of selected data for Drummond and Phillipsburg follows:

(Temperature in Degrees F., Precipitation in Inches)

Station	Elevation	Years of Record	Average Annual Temp.	Highest	Lowest	Average Annual Precip.	Wettest Year	Driest Year
Phillipsburg	5280	42	40.9	99	-40	15.28	20.32 (1938)	8.36 (1931)
Drummond	4240	26	40.1	101	-42	12.30	15.79 (1941)	8.79 (1952)
Silver Lake	6480	49	----	----	----	19.61	34.86 (1908)	13.35 (1935)
Garnet	6060	5	----	----	----	25.00*	29.31 (1955)	21.80 (1957)

*approximate

SOILS

Granite County lies in the Columbia Basin portion of western Montana. It reaches from the Continental Divide on the south and extends to a few miles north of the Clark Fork River. The county is drained by Flint and Rock Creek, and the main stem of the Clark Fork. Drainage in the northeast part of the county is through minor tributaries that run directly into the Clark Fork River. Physiographically the county consists of high mountains with wide sediment filled valleys. Sediment in these valleys were deposited as outwash from the mountains and materials deposited by glaciers. Glacial deposits, both till and outwash, are extensive in the south part of the county. Elevations range from above 10,000 feet on the Continental Divide to a little below 4,000 feet at the point where the Clark Fork River leaves the county.

The character of soils is determined by parent materials, topography, vegetation, climate and time. Since all of the soil forming factors are varied there are a wide variety of soils in Granite County. Geologic materials include granite, rhyolite, basalt, argillite, quartzite, limestone, shales, sandstones, unconsolidated valley filling materials of outwash origin, glacial till and recent alluvium. The farming soils and many of the grassland soils are developed in the unconsolidated sediments and in alluvium. Some grassland soils were developed from granites, argillites and quartzites, shales and sandstones.

Silt loams to clay loams predominate. There are a few significant areas of clays and some sandy soils near stream channels. In some of the soils from valley filling sediments and some alluvial soils the content of gravel, cobbles and stones is high enough to seriously reduce their moisture holding capacity. Some of the alluvial soils and glacial till soils are too strong for cultivation.

Soils of the grassland and farming areas belong in the Chestnut and Chernozem zonal groups with significant inclusions of Regosols and Lithosols with alluvial and Humic Gley soils in the stream valleys. Soils that were developed under dense conifer forests belong in the Grey Wooded and Podsol great soil groups. Because they are generally strong and occur in areas of unfavorable climate they are best suited to woodland and wildlife use.

A soil survey is now in progress in Granite County. When completed the survey will be published in the standard soil survey series of the Department of Agriculture. The information in the published report will provide a sound physical basis for planning the best use of the land covered by the soil survey.

SOURCES OF WATER SUPPLY

The major streams and their tributaries comprising the drainage area in Granite County are Rock Creek and Flint Creek. These streams with their tributaries contribute all of the water for irrigation in the Flint Creek Valley.

Headwaters of Rock and Flint Creek are in the southern part of the county, with Rock Creek flowing north along the western boundary and into the Clark Fork River. Flint Creek follows a northerly course through the central part of the Flint Creek Valley to its confluence with the Clark Fork at Drummond. The Clark Fork (also called the Hellgate River through this area of Granite County) enters the county from the east in the northern part and follows a route west into Missoula County.

In addition to the Clark Fork River, Rock Creek and *Flint Creek, tributaries of these streams of importance for irrigation are as follows: North Fork Gold Creek, *Dunkleberg Creek, *Burt Creek (Bert Creek), Bergman Creek (Ackerman or Perryman Slough), *Drummond Tunnel (Tunnel Creek), *Trout Creek, *East Fork Trout Creek (Wyman Creek), Travelers Home Creek, *Summer Gulch (Spring Creek), *Fred Burr Creek and tributaries, *Alkali Slough (Spring Creek), *Frost Creek, *Boulder Creek, *South Fork Boulder (Clear Creek), *Wyman Creek (South Fork Boulder), *Girds Creek, *Smart Creek, *Unnamed Spring (Trib. to Smart Creek), *Douglas Creek (McCarty Creek), *Barnes Creek, *Lower Willow Creek, South Fork Lower Willow Creek, *Cow Creek, *Edwards Creek, *Bear Creek, *Deep Creek, *Tyler (McCarthy Creek), *East Fork Rock Creek, *Meadow Creek, *Beaver (Showers Creek), Ross' Fork Rock Creek, *Gilstrap Creek, Upper Willow Creek, *Scotchman's Creek, and *Horse Canyon Creek.

* The above named streams are adjudicated in Granite County.

STREAM GAGING STATIONS

The U. S. Geological Survey measures the flow of streams, cooperating with funds supplied by several State and Federal agencies. The results are published yearly in book form as Water-Supply Papers, the latest being for the year 1956. The later records may be obtained prior to publication from the U. S. Geological Survey. That agency's records and reports have been used in the preparation of this resume.

Data given below cover the stream gaging records which are available for Granite County from the beginning of measurements through the water year 1957. The water year begins October 1 and ends September 30 of the following year.

The irrigated figures shown for ditch diversions above the gage are taken from the final results of the Water Resources Survey for the active gaging stations operated at the present time. For the gaging stations now discontinued, the acreage figures above the gage were estimated by the Geological Survey at the date of operation.

Following are equivalents useful in converting from one unit of measurement to another:

(a) In Montana, one cubic foot per second equals 40 miner's inches.

(b) One acre-foot is the amount of water required to cover an acre one foot deep.

(c) One cubic foot per second will nearly equal two acre-feet (1.983) in 24 hours.

(d) A flow of 100 miner's inches will equal five acre-feet in 24 hours.

(e) One miner's inch flowing continuously for 30 days will cover one acre 1½ feet deep.

For reference purposes, the stream gaging stations are listed in downstream order.

Georgetown Lake Near Southern Cross*

The staff gage is at dam on Flint Creek 2 miles west of Southern Cross and 8 miles south of Phillipsburg. The drainage area is 59.1 square miles. It has a storage capacity of 31,000 acre-feet. Month-end reservoir contents have been published in U. S. Geological Survey Water-Supply Papers from Oct. 1939 to date. The maximum contents observed, 29,670 acre-feet (July 31, 1955); minimum observed, 16,020 acre-feet (April 30, 1957). Storage began about 1905 for pumpage into Warm Springs Creek for use of Anaconda Copper Mining Co. reduction works at Anaconda or for release through Flint Creek for power development. Records are furnished by the Montana Power Co.

Flint Creek Near Southern Cross*

The staff gage and Cippoletti weir are half a mile downstream from power plant, 2 miles downstream from Georgetown Lake, 3 miles northwest of Southern Cross and 6 miles south of Phillipsburg. The drainage area is 52.6 square miles. Records are available from Oct. 1940 to date. The maximum discharge was 174 cfs (June 13, 1942) and the minimum was probably no flow (for parts of Aug. 20, 1943, May 23, 1952, Oct. 6, 1954, when generator was shut down). The average discharge for 18 years (1941-58) was 30.1 cfs or 21,790 acre-feet per year. The highest annual runoff was 41,660 acre-feet (1948) and the lowest 13,040 acre-feet

(1957). Flow regulated by Georgetown Lake. It may be increased by trans-basin diversion from Silver Lake to Georgetown Lake or reduced by pumping from Georgetown Lake to Silver Lake.

Trout Creek Above Main Canal, Near Phillipsburg (Discontinued)

The water-stage recorder was just upstream from main supply canal from East Fork Rock Creek and 12 miles southwest of Phillipsburg. The drainage area is 4.16 square miles. Records are available from Dec. 1945 to Sept. 1949. The maximum daily discharge was 45 cfs (Apr. 16, 1948) and the minimum recorded 0.3 cfs (July 30, 1946). There was one small irrigation diversion above the station.

Trout Creek Near Southern Cross (Discontinued)

The water-stage recorder was a quarter of a mile upstream from mouth, 4½ miles southwest of Phillipsburg and 6½ miles northwest of Southern Cross. The drainage area is 34.8 square miles. Records are available from Oct. 1945 through Sept. 1951. The maximum discharge was 331 cfs (Apr. 16, 1948) and the minimum 7.1 cfs (Mar. 14, 1949). The average discharge for 6 years (1946-51) was 36.6 cfs or 26,500 acre-feet per year. The highest annual runoff was 29,720 acre-feet (1951) and the lowest 20,660 acre-feet (1946). There are irrigation diversions above the station for about 4,000 acres of which 1,500 acres are below station. During the irrigation season the natural flow is supplemented by water from East Fork Rock Creek.

Spring Creek Near Phillipsburg (Discontinued)

The staff gage was 1,000 feet above confluence with Flint Creek and 3½ miles south of Phillipsburg. The flow was affected by seepage, waste water from irrigation, and springs. There were no daily discharge records computed, but unpublished records of a few miscellaneous discharge measurements between Dec. 13, 1945 and May 20, 1947 are in the U. S. Geological Survey files.

Trout Creek Near Phillipsburg (Discontinued)

The wire-weight gage was 300 feet upstream from mouth and 4½ miles southwest of Phillipsburg. The drainage area is 34.9 square miles. Intermittent records are available from May 1939 to June 1943 and Aug. 1945 to Sept. 1946. The maximum discharge was 600 cfs (Mar. 28, 1943, partly estimated) and the minimum observed 3.6 cfs (May 26-29 and June 2, 1940). There were many diversions above station for irrigation. The natural flow is supplemented by diversion from East Fork Rock Creek during the irrigation season.

Marshall Creek Near Phillipsburg (Discontinued)

The staff gage was at the county bridge three-quarters of a mile upstream from mouth and 2½ miles northwest of Phillipsburg. The drainage area is 22.8 square miles. Records are available from June to Sept., 1942 and for June, 1943. The maximum discharge observed was 43 cfs (June 9, 10, 1942) and the minimum observed 0.9 cfs (Aug. 13, 14, 1942). There were small diversions above the station for irrigation. At times during irrigation season the flow is supplemented by water from East Fork Rock Creek which is diverted through a canal into Trout Creek, thence into Marshall Creek.

Marshall Creek at Mouth (Discontinued)

The wire-weight gage was a quarter of a mile upstream from mouth and 2½ miles north of Phillipsburg. The drainage area is 23.2 square miles. Records are available for irrigation seasons from May 1939 to Oct. 1941. The maximum discharge observed was 46 cfs (June 4, 5, 1941) and the minimum, no flow at times. There were small diversions above the station for irrigation. At times during irrigation season flow is supplemented by water from East Fork Rock Creek which is diverted through a canal into Trout Creek, thence into Marshall Creek.

Flint Creek Near Phillipsburg (Discontinued)

The wire-weight gage was 1½ miles downstream from Marshall Creek and 4 miles north of Phillipsburg. The drainage area is 192 square miles. Records are available from May 1939 to Oct. 1940. The maximum discharge observed was 157 cfs (June 5, 1939) and the minimum observed, 21 cfs (May 21, 1940). There were diversions above station for irrigating about 8,000 acres. During irrigation season flow is supplemented by water from East Fork Rock Creek through a canal into Trout Creek, thence into Flint Creek. Some regulation is provided by Georgetown Lake.

Flint Creek Above Maxville Siding at Maxville (Discontinued)

The wire-weight gage was three-quarters of a mile southwest of Maxville and 1½ miles upstream from Boulder Creek. The drainage area is 207 square miles. Records are available from Apr., 1939 to Sept., 1941. The maximum discharge observed was 290 cfs (June 1, 1941) and the minimum observed 21 cfs (Jan. 3, 1941). There were diversions above the station for irrigating about 8,200 acres. During the irrigation season the flow is supplemented by water from East Fork Rock Creek which is diverted through a canal into Trout Creek, thence into Flint Creek. Some regulation is provided by Georgetown Lake.

Flint Creek at Maxville*

The water-stage recorder is 0.4 mile west of Maxville and 1 mile upstream from Boulder Creek. The drainage area is 208 square miles. Records are available from August 1941 to date. The maximum discharge was 1,680 cfs (Mar. 28, 1943) and the minimum daily was 20 cfs (Jan. 26, 1957). The average discharge for 16 years (1942-1957) was 101 cfs or 73,120 acre-feet per year. The highest annual runoff was 116,900 acre-feet (1948) and the lowest 51,450 acre-feet (1945). There were diversions above the station for irrigating about 8,200 acres. During the irrigation season the flow is supplemented by water from East Fork Rock Creek which is diverted through a canal into Trout Creek, thence into Flint Creek. Some regulation is provided by Georgetown Lake.

Boulder Creek at Maxville*

The water-stage recorder is an eighth of a mile upstream from mouth and three-quarters of a mile north of Maxville. The drainage area is 71.3 square miles. Records are available from Apr. 1939 to date. The maximum discharge was 764 cfs (June 13, 1953) and the minimum 4.2 cfs (Sept. 12, 13, 1954). The average discharge for 18 years (1940-1957) was 47.3 cfs or 34,240 acre-feet per year. The highest annual runoff was 52,060 acre-feet (1948) and the

lowest 20,820 acre-feet (1940). There is a diversion above gage to irrigate about 350 acres which are below the station.

Flint Creek Near Maxville (Discontinued)

The wire-weight gage was about 50 feet downstream from the point of diversion of Allendale Canal and 4 miles north of Maxville. The drainage area is 325 square miles. Records are available for parts of the irrigation seasons from Apr. 1946 to Aug. 1949. The maximum discharge observed was 1,700 cfs (June 4, 1948) and the minimum 24 cfs (July 16, 1949). There were diversions above the station for irrigation of about 19,500 acres of which 9,500 were below the station. During the irrigation season the flow is supplemented by water from East Fork Rock Creek which is diverted through a canal into Trout Creek, thence into Flint Creek. There is some regulation by Georgetown Lake.

Flint Creek Near Hall (Discontinued)

The wire-weight gage was 400 feet upstream from bridge on U. S. Highway 10A, 1½ miles upstream from Douglas Creek and 4 miles south of Hall. The drainage area is 325 square miles. Records are available for May to Sept. 1939. There were diversions above the station for irrigation of about 19,500 acres of which 9,500 were below the station. During the irrigation season the flow is supplemented by water from East Fork Rock Creek which is diverted through a canal into Trout Creek, thence into Flint Creek. There is some regulation by Georgetown Lake.

Flint Creek Near Drummond (Discontinued)

The wire-weight gage was on county highway bridge 1¾ miles upstream from mouth and 2½ miles south of Drummond. The drainage area is 490 square miles. Records are available from June 1948 to Sept. 1949. The maximum discharge observed was 1,800 cfs (June 3, 1948) and the minimum observed was 10 cfs (Aug. 12, 1949). There were diversions above the station for irrigating about 25,000 acres of which 1,000 were below the station. During the irrigation season flow is supplemented by water from East Fork Rock Creek which is diverted through a canal into Trout Creek, thence into Flint Creek. There is some regulation by Georgetown Lake.

Middle Fork Rock Creek Near Phillipsburg*

The water-stage recorder is a quarter of a mile upstream from East Fork, 2½ miles upstream from West Fork and 15 miles southwest of Phillipsburg. The drainage area is 123 square miles. Records are available from Sept. 1937 to date. The maximum discharge was 1,430 cfs (June 13, 1953) and the minimum was 4.5 cfs (Dec. 9, 10, 23, 24, 1944). The average discharge for 20 years (1938-57) was 121 cfs or 87,600 acre-feet per year. The highest annual runoff was 125,800 acre-feet (1947) and the lowest was 45,200 acre-feet (1940). There are a few small irrigation diversions above the station.

East Fork Rock Creek Reservoir*

The dam on the East Fork of Rock Creek 14 miles southwest of Phillipsburg was constructed by the Montana State Water Conservation Board to furnish a supplemental water

supply to about 25,000 acres in the Flint Creek Valley. It has a usable capacity of about 16,000 acre-feet and began storing water in 1936. Month-end contents as available have been furnished by the Water Conservation Board and published in U. S. Geological Water-Supply Papers from Oct. 1939 to date.

East Fork Rock Creek Near Phillipsburg (Discontinued)

The staff gage was 200 feet upstream from Flint Creek Canal, 1,000 feet downstream from the dam, 3 miles upstream from Meadow Creek and 14 miles southwest of Phillipsburg. The drainage area is 30.3 square miles. Records are available for most months from June 1935 to May 1943. The average discharge for 5 years (1937-42) was 35.1 cfs or 25,410 acre-feet per year. The maximum discharge observed was 358 cfs (June 10, 1942) and the minimum observed was 2.0 cfs (Sept. 30, 1940). The highest annual runoff was 42,440 acre-feet (1942) and the lowest was 12,030 acre-feet (1937). The flow was completely regulated after Oct. 15, 1936 by the East Fork Rock Creek Reservoir.

Rock Creek Near Quigley (Discontinued)

The wire-weight gage was a quarter of a mile upstream from Ranch Creek and 2½ miles south of Quigley. The drainage area is 749 square miles. Intermittent records are available from May 1922 to Sept. 1927. The maximum daily discharge was 8,000 cfs (estimated, June 10, 1927) and the minimum observed was 115 cfs (Dec. 17, 1924). There were many diversions above station for irrigation.

Ranch Creek Near Quigley (Discontinued)

The staff gage was at the county bridge a quarter of a mile upstream from the mouth, 2¼ miles south of the townsite of Quigley and 15 miles south of Clinton. The drainage area is 42.7 square miles. Intermittent records were obtained from May 1922 to Sept. 1927. The maximum discharge was 238 cfs (May 19, 20, 1922) and the minimum observed was 11 cfs (Feb. 1, 1924). There were a few diversions above the station for irrigation.

Rock Creek Below Ranch Creek, Near Quigley (Discontinued)

The staff gage was a quarter of a mile downstream from Ranch Creek and 2 miles south of Quigley. The drainage area is 794 square miles. Records are available from Oct. 1910 to Oct. 1911 and from Mar. to Sept. 1912. The maximum discharge observed was 4,560 cfs (June 8, 1911) and the minimum observed was 171 cfs (Feb. 21, 1911, but probably was less during periods of no gage-height record). There were many diversions above the station for irrigation.

Miscellaneous Discharge Measurements

Measurements of discharge at points other than regular gaging stations are made occasionally. These are reported in annual Geological Survey Water-Supply Papers in lists at the end of each report.

*These gaging stations are now in operation (1959).

MINING

Granite County was created in 1893, a year that, ironically, also ended a twelve-year period of prosperity for one of the most productive silver mining areas of the United States.

Like many counties in Montana, the county owes its inception and first surge of growth to the mining industry. Although it is difficult to pin point the initial discovery of valuable minerals, the placers along Bear Creek, Gold Creek, and other tributaries of the Clark Fork River are known to have been active in the early 1860's.

With the discovery of the Hope Mine in the Flint Creek district in 1864 by Hector Horton, the most prosperous of the county's mining districts became active. The following year Phillipsburg was founded and was eventually named after Philip Deidsheimer, first superintendent of the St. Louis-Montana Gold and Silver Mining Company. The company owned and operated the Hope Mine and mill. During a span of several years most of the important silver-bearing ore bodies in the Phillipsburg district were discovered and the mining camps at Granite, Princeton, Maxville, Rumsey, Hasmark, and others sprang into being.

The period of greatest prosperity was from 1881 to 1893 during which time the Granite Mountain Mine was most productive and the largest ore bodies of the Bimetallic, Hope, Algonquin, Combination, and Pyrenees Mines were uncovered. Until 1887, when the railroad was completed to Phillipsburg, overland freight rates were prohibitive and recovery of silver from its ores within the district was costly. With transportation no longer a problem and with improved treating practices, the Phillipsburg district soon became a leading silver producing area of the early 1890's.

Although Granite County has its share of ghost towns that reflect the effects of market conditions on a one-metal economy, Phillipsburg remains active. Manyfold geologic conditions have created a diversity of mineral deposits. Many of the silver-bearing veins contain significant amounts of zinc, lead, and manganese, all of which were produced in substantial quantities during both World Wars. Low-grade but important reserves of tungsten minerals are known northwest of Phillipsburg, and phosphate rock has been shipped from several properties in the area. Minor amounts of iron ore of contact metamorphic origin have been produced from an area southeast of Phillipsburg.

An estimated $80,000,000 worth of gold, silver, lead, zinc, and copper had been produced by 1957. Silver accounts for about three-fourths of the total value.

Geologically, Granite County can be divided into two large areas, one on either side of Flint Creek to the north and Trout Creek to the south. Precambrian rocks of the Belt series underlie the region west of the valley. In the Sapphire Mountains in the extreme western part of the county are outcroppings of granitic rocks, which are part of the Idaho batholith. East and south of Flint Creek, folded and faulted sedimentary rock from Precambrian to Cretaceous occurs. The sediments have been intruded by granitic rocks of the Phillipsburg and Mount Royal batholiths. It is within the eastern division that most of

the mineral wealth is concentrated. Tertiary volcanics overlie older rocks in some areas and glacial moraines of Quaternary age are found in the higher mountain valleys.

The gold, silver, and base metal mining districts are described below:

Antelope Creek

Several deposits of low-grade gold ore occur about 12 miles southeast of the county seat. The district is in a large area of low mountains underlain by Belt series sedimentary rocks—shale, quartzite, limestone, and slate. Small outcroppings of igneous rock are scattered throughout the area. The Mountain Ram Mine is the only mine in the district upon which any considerable amount of development work has been done. In 1935, about $15,000 in gold ores was produced.

Alps (Bonita)

Bonita, a station on the Northern Pacific and Chicago, Milwaukee, St. Paul and Pacific Railroads, is in the northwestern part of the county. The district is underlain by rocks of the Belt series which have been intruded by small masses of granitic rocks. Although total production is insignificant, small shipments of gold ore and bullion have been made from the Golcoreda, Gold Bug, and Rainy Day Mines. Since 1935, about $24,000 in gold ores has been produced.

Combination (Henderson) (Black Pine)

Combination and Henderson were small mining camps between Flint Creek and Willow Creek, about 10 miles northwest of Phillipsburg. Placer gold was discovered along Henderson Gulch by Joe Henderson in 1865. He also gave his name to the district and to the Henderson Mine. Beltian rocks, predominantly the Newland formation, underlie the entire district except for several small granite and granodiorite dikes. The important ore deposits, Combination, Henderson, and Queen veins, occur as fissure fillings in quartzites and as replacement deposits in limestones and calcareous shales. The ore bodies are, for the most part, low grade, the Combination Mine being a silver producer and the Henderson a gold mine. Approximately $3,000,000 in gold and silver ores has been produced from this district, and about one-third of the total was derived from placer operations. The Combination Mine accounted for the bulk of the lode production.

Dunkleberg

The Dunkleberg district is in the northeastern part of the county, south of Jens. Sandstones and shales of the Colorado and Kootenai formations underlie most of the mineralized area. Older formations, the Ellis, Phosphoria, and Quadrant, are exposed to the south. Diorite and gabbro sills up to 1,000 feet thick have intruded sandstones and shales. Bedding planes in the sedimentary rocks contain quartz fissure veins which carry lead, zinc, silver, and other metals. Argentiferous galena and cerussite (lead carbonate) are the principal ore minerals. The veins are narrow, but usually persist in length and depth. The Wasa Mine, on a contact metamorphic deposit, was the district's main producer of zinc, whereas the Forest Rose, on a replacement vein, produced large quantities of lead. Both mines were active during the World Wars. Between 1880 and 1957, the district produced about $1,200,000 in lead, zinc, and silver.

Frog Pond Basin

This small district is about 38 miles by road southwest of Phillipsburg. It straddles the Sapphire Mountains divide at the head of Ross Fork Creek and has a counterpart just over the divide in Ravalli County. The ore deposits, which have never been very productive, occur in veins in granite of the Idaho batholith. Rocks of the Belt series underlie most of the area. Small lots of gold and lead-zinc ore have been shipped from the Miller and Gold Leaf properties. Records indicate that the district has yielded about $23,000 in metallic ores.

Garnet (Top o'Deep) (First Chance)

The Garnet district is in northern Granite County, north of Bearmouth. Gold-bearing gravel was discovered along Bear Gulch in 1865, and although the deposits were narrow, they proved to be exceptionally rich; some yielded as much as $1,200 per foot. The contact between the great areas of Precambrian slates, schists, and quartzites of northwestern Montana and the thick beds of Paleozoic limestones and other sediments to the southeast crosses the northern part of the district. Both series of sedimentary rocks have been intruded by stocks of granodiorite. In some areas, younger rhyolitic and basaltic lavas overlie all other formations. Lode deposits occur as veins in fractured granodiorite; and as replacements and fissure fillings along bedding planes in limestone. The veins are, for the most part, rich in gold, but also carry some copper, silver, and lead. The most productive lode mines were the Nancy Hanks, Dewey, Shamrock, Tiger, and Grant and Hartford. Total production has been over $11,000,000.

Maxville (Wyman) (Gird Creek)

The Maxville district is 9 miles north of Phillipsburg near the junction of Flint Creek and Boulder Creek. Veins carrying silver, gold, and copper occur in folded and faulted sedimentary rocks which range from Precambrian to Cambrian in age. Low-grade, but persistent ore bodies of copper have been noted in fractured and altered limestones and sandstones. Since the beginning of the mineral industry in this area, about $100,000 has been realized from the production of gold, silver, and copper. Almost one-half of this total has come from the Durand Mine.

Phillipsburg (Flint Creek)

This small, but very important district, which covers an area of about 5 square miles around Phillipsburg, Granite, and Tower, is responsible for approximately 77 per cent of the county's total production. From 1865 to 1957 the district had produced between $62,000,000 and $64,000,000 worth of precious metals—mostly in silver. Underlying the district are sedimentary rocks ranging in age from Precambrian to Mississippian; the Paleozoic series of limestones, sandstones, and shales is the most extensive. Granitic rocks of the Phillipsburg batholith have intruded the sediments to the west. Ore deposits are exceptionally rich in silver and occur as veins in granite, limestones, and other sediments. Mineralization also occurs along bedding planes in calcareous rocks. Magnetite is found as contact deposits adjacent to the batholith. Since 1916, maganese has been an important product of the district. Silver has accounted for about 90 per cent of the total production; gold, lead, zinc, and copper make up the rest. The Granite Mountain Mine was at one time the most productive silver mine in the United States. This mine, now incorporating the workings of the Bimetal-

lic and known as the Granite-Bimetallic Mine, had produced more than $32,000,000 in silver- and gold-bearing ores by 1913. Nearly all the recorded production for the late 1880's and early 1890's came from the Granite, Bimetallic, Hope, and Trout Mines. In later years, the properties now known as True Fissure and Scratch All were also quite productive.

Red Lion

The Red Lion district is about 5 miles southeast of Phillipsburg. It lies just north of the Georgetown or Cable district in Deer Lodge County. Sedimentary rocks of the area include a complete sequence from the Newland limestone of the Belt series to the Madison limestone of Mississippian age. Folding and faulting have distorted the beds, and near the northern part the sediments are in contact with granite. During the late 1880's silver and gold were produced from replacement deposits in limestone and from fissure fillings in other rocks. To 1957, approximately $810,000 had been produced, mostly in silver ores from the Hannah, Red Lion, Modoc, and American Flag Mines.

Rose Mountain (Gold Creek)

The Rose Mountain district comprises an area at the headwaters of Gold Creek and its tributaries in Granite County. Gold-and copper-bearing quartz veins occur in granite. Although the lode mines were never very productive, the quartz lode deposits were, undoubtedly, responsible for the gold in the placer deposits downstream. Total production, mostly in gold, is estimated at $50,000.

South Boulder (Princeton)

Princeton is an abandoned mining camp on Boulder Creek about 6 miles southeast of Flint. The district encompasses a basin drained by Boulder Creek and its tributaries and is underlain by steeply tilted sedimentary rocks up to Mesozoic in age. To the north and west the sediments have been intruded by granite of the Mount Royal batholith; south of Boulder Creek the sediments have been cut by the Phillipsburg batholith. The most productive mines in the district, such as the Royal, Sunday, Bluebird, and Tussel, are on gold-bearing veins in granite. However, the Nonpareil, Powell, Gold Reef, Mountain Lion, and Princeton have produced gold from fissure veins in sedimentary rocks. Gravels along Princeton Gulch carry some gold. Total value of metals produced is about $1,600,000.

Welcome Creek and Rock Creek

Rock Creek and its tributary, Welcome Creek, are in the western part of the county. Gold-bearing gravels have been worked along both creeks since 1891, but production for the past fifteen years has been very small. Many gravel deposits contain abundant sapphires. Over $100,000 in gold has been taken from along these streams.

Other Mineral Deposits

Manganese: Manganese was first produced in the Phillipsburg district in 1900 from the Coyle Mine. World War I established a need for this steel-hardening metal, and ever since manganese mining increased until it has become the principal industry in the district. In 1918, it was found that the manganese oxides from Phillipsburg could be concentrated for use in dry batteries. The mines have remained the principal domestic source of battery-grade

material in the United States. During and after World War II manganese was produced in large quantities, and after 1951 the bulk of production was delivered to Government stockpiles. Many mines were forced to close in 1958 because of the fulfillment of Government contracts. Manganese oxides and carbonate minerals occur in irregular replacement deposits in limestones and are associated with silver and zinc minerals. The Trout, Algonquin, Scratch All, and True Fissure have been the most important producers. From 1916 to 1957 the Phillipsburg-area mines have produced over 870,000 tons of manganese crude ore and concentrates and low-grade ore for stockpiles.

Phosphate Rock: Layers of phosphate rock interbedded with shales of the Phosphoria formation are found north of Phillipsburg. Folding of the Paleozoic formation has tilted and exposed the Phosphoria mostly within a large area drained by Boulder, Douglas, Gird, and Steward Creeks. Mineable beds of phosphate rock up to six feet thick contain as high as 31 per cent P_2O_5 (phosphorous pentoxide). Intermittent production has been recorded from the Douglas Creek, Moonlight, and Edgar Mines.

Tungsten: During World War II tungsten concentrates were produced from placers in the Combination-Henderson district. Scheelite (calcium tungstate) is found associated with gold-bearing gravels along Henderson Gulch. Source of the mineral was found to be a granodiorite intrusive near the mines. Although the mass was low in tungsten content, it is reported to constitute a very large low-grade deposit for future use. Hubnerite, a manganese tungstate, has been found in the quartz veins of the Combination Mine. One ton of hand-sorted ore was marketed from this property during the war. The shipment contained 21 per cent tungsten trioxide.

SOIL CONSERVATION DISTRICT

Granite Soil Conservation District is located in the southwestern part of the State, is all contained within the boundaries of Granite County comprising an area of 1,120,109 acres. The District was organized in 1954 under Montana State Law as a legal subdivision of State Government by farm and ranch operators and owners. This District is entirely surrounded by organized Soil Conservation Districts. Two National Forests, namely, Lolo and Deer Lodge National Forest covers a part of the District. Headquarters for District activities is located at Phillipsburg.

The Granite Soil Conservation District is drained by two major tributaries of the Clark Fork River. The east half is drained by Flint Creek which flows into the Clark Fork at Drummond, the west half is drained by Rock Creek which also flows north into the Clark Fork and is noted for its recreation opportunities. Over 75% of the total land area is mountainous and covered with timber ranging from open yellow pine forest to dense stands of Douglas fir and lodgepole pine. Native bunch grasses occupy the bordering foothills, open parks and mountain meadows to provide summer grazing for both sheep and cattle.

The District is governed by a board of five supervisors, elected by landowners or occupiers within the District, under provisions of State law. Through the elected governing body called the Board of Supervisors, the local people direct and manage their own affairs. The District carries out a comprehensive work plan designed to provide a well-rounded and

coordinated plan for the control and prevention of erosion and the conservation of soil and water resources.

The District coordinates the conservation efforts of various State and Federal agencies and other organizations. It maintains supplemental memorandums of understanding with the Soil Conservation Service, U. S. Forest Service, and Office of the State Forester.

The Soil Conservation Service assists the District in making necessary Soil and other surveys, in developing conservation plans, and aids landowners and operators to perform operations requiring technical skills beyond the experience of the individuals involved.

The Forest Service and the Office of the State Forester cooperate with the District in the coordination of programs in the fields of forest fire control, timber management and watershed protection on Federal, State, and private lands.

The Granite Soil Conservation District has made excellent progress in attaining sound land use by its motto, "to use each acre of land within its capabilities and treatment according to its needs."

Technical services are available to the 170 ranchers within Granite County to solve problems in range management, wet meadow renovation, reorganization of irrigation systems, drainage, crop rotations, and other agronomic practices.

Detailed soil surveys, range site and condition surveys, engineering surveys involving drainage, irrigation, and livestock water developments are provided farm and ranch operators and owners in the development of basic conservation plans, stating how the land will be used according to its capabilities and how it will be treated according to its needs. Technical assistance from the District is provided only to the private lands. The farmers or ranchers make the final decisions recorded in the conservation plan based upon the technical range and soil surveys and with counsel of the technicians.

On irrigated lands the assistance is given primarily to reorganization of irrigation systems, water control structures, sprinkler irrigation systems, drainage of wet lands, proper application of irrigation water, adapted plant materials, crop rotations, soil-water-plant relationships and irrigated pasture management.

Technical assistance on dry lands is given primarily on improved tame pastures, reseeding methods and range land management. On range lands, technical assistance is given on deferred grazing, proper utilization, stock water developments, fencing and salting practices. On woodlands most assistance is for timber stand improvement and adopted cutting methods. Assistance is also given in design and layout of farmstead windbreaks and shelterbelts on both irrigated and dry lands.

In the brief time since the District has been operating, more than 18 miles of main irrigation canals have been constructed or improved with 105 water control structures installed to improve the water application on 2,869 acres. Nine miles of drainage ditches have improved 729 acres of wet lands with high water tables to a point where they can now be

cropped successfully. Impressive yields of adopted plant varieties have been obtained on many of these seeped lands which were formerly unproductive or poor quality forage produced.

Pasture plantings have been seeded on 806 acres of dry land, for increased pasture use during the grazing season. Approximately 2,212 acres of old irrigation systems have been revised in the district to date.

During 1957 and 1958 rapid progress has been initiated in the development of a watershed work plan for watershed protection and flood prevention to the Lower Willow Creek Watershed under Public Law 566 with technical assistance of the Soil Conservation Service. The creek rises to the west and south of the town of Hall, Montana and flows generally in a northeasterly direction. It is a tributary of Flint Creek and the Clark Fork River. A period of five years will be required to complete the project.

The principal purpose of the work plan is to provide watershed protection and irrigation development including a supplemental irrigation water supply and an improved distribution system. The work plan covers an area of 111 square miles or 71,200 acres with an 85 foot earth fill dam, retaining 5,000 acre-feet of runoff water for irrigation and acts at the same time as a flood prevention structure.

Other phases include land treatment measures on the land above the structure to assure its continued effectiveness for water storage and an effective soil conservation program below to make the most efficient and permanent use of the soil and water resources.

Progress in achievement of sound land use in the District has been excellent through the cooperative efforts of land owners, operators, along with the various Federal, State and local agencies or groups.

Success of the District has been largely by the general publics' realization that conservation is a continuing activity, with greater need for resource management for protection and improvement. The people are willing to share in the idea of providing enduring benefits to their own and future generations.

FISHERIES

Many fine trout waters are found in this county. Rock Creek, a very productive stream, is considered one of the top six trout fishing streams in the state. Georgetown Lake is an important source of cutthroat and rainbow trout eggs for the Montana hatchery system, in addition to being an excellent trout fishery. Forty tons of trout were caught in this lake by fishermen from June 1958 through February 1959. A mile-long section of Flint Creek has been used by the Montana Fish and Game Department since 1954 as a test stream for improving the survival of hatchery reared trout.

NATIONAL FORESTS

Portions of both the Lolo and Deer Lodge National Forests are located in Granite County. The net national forest land in the county is divided as follows: 195,563 acres are

in the Lolo National Forest and 442,708 acres are in the Deer Lodge National Forest—a total of 638,271 acres.

This area comprises parts of three ranger districts with headquarters at Bonita, Phillipsburg, and Deer Lodge. The district rangers are responsible for the administration, management and protection of the national forest resources on their districts.

The headwaters of Rock Creek are on the Deer Lodge National Forest. Flint Creek and tributaries drain most of the area into the Clark Fork River. Lost Creek, Racetrack Creek, Dempsey Creek, Pikes Peak Creek, Gold Creek, and Dunkleberg Creek drain a smaller portion of the Deer Lodge National Forest, located east and north of the Flint Creek Range, into the Clark Fork River.

Generally, the Granite County lands within the national forest area are steep and rugged. The slopes facing Rock Creek are very steep with numerous outcroppings of rock. Fairly flat land is found on top of the divide between Granite and Ravalli Counties. Elevations vary from 3,500 feet to 10,635 feet. Most soils are of granitic origin and the terrain shows widespread evidence of glaciation, especially at the higher elevations. Soils are generally thin. Care must be exercised to prevent excessive movement of soil and sedimentation of the streams.

Annual precipitation varies from the average of about 11 inches to 34½ inches on the Bitterroot divide at the headwaters of Big Rock Creek. Runoff is heaviest in the last part of May and the first part of June due to snowmelt in the heavy snowpack areas. Infiltration and delayed water storage in the soil are dependent on the management of vegetation.

Approximately 70 per cent of the national forest land is presently classified as commercial forest with about 75 per cent of this amount being lodgepole, 15 per cent Douglas fir, and 10 per cent spruce, alpine fir and ponderosa pine types. The most accessible commercial timber in the lower Flint Creek drainage was first cut over in part for early construction of railroads and settlements and subsequently by small mills operating in the Maxville, Hall, and Drummond area. The remainder of Granite County and the major area of forested lands as yet have not been cut over and offer considerable potential in future timber industry. Although the final compilations of detailed timber inventories have not been completed, a sustained allowable annual cut of timber products of 38,600,000 board feet or more is indicated. Timber types in the area which have been cut over under proper management appear to restock satisfactorily.

Most of the range use is concentrated in the Harvey Creek area. Portions of the balance of the national forest area can support limited livestock use. There are 55 cattle permits, totaling 3,867 cattle, which use portions of this part of Granite County for summer grazing.

Rather extensive mining operations were conducted in the early part of the century with some damage to streams. The activity now, however, is rather minor. Numerous placer and lode claims still exist but few of these are being commercially exploited. The damage to streams and watersheds from mining has not been extensive. Some areas were

rather heavily cut to provide fuel and mine timbers but these lands have restocked naturally with young growth. There is very little control of placer mining operations. Under existing laws there is no provision to protect the watershed by the rehabilitation of streams following scouring of drainages by dredging or common placer operations. Proposed placer operations on the West Fork of Rock Creek might threaten stability and water quality of this drainage.

Proper road location and good road construction standards are essential to keep sedimentation and soil erosion to a minimum. As a rule, sustained road grades up to 6 per cent and trail grades up to 12 per cent with proper drainage keep sedimentation and erosion to a minimum.

Generally the watershed conditions in this portion of Granite County are considered as good. Proper management will be necessary to keep them in continued good condition and prevent damage. Overstocking by either domestic stock or wild game could present serious problems. Every effort must be made to keep a protective cover on the land surface. There are isolated areas where overgrazing by both domestic stock and big game animals has caused accelerated erosion. Action is being initiated to re-establish adequate vegetation and litter cover on such areas. Public understanding of the potential permanent damage which can be caused on overstocked big game ranges is important in preventing more permanent damage to watersheds. Control of big game numbers is being administered cooperatively with the Montana State Fish and Game Department. Damage to the watershed can result from forest fires, tree insects and diseases, improper timber cutting, poor mining operations, steep grades and poor drainage on road locations, poor construction or maintenance of reservoirs and dams, and overgrazing or trampling by domestic livestock or big game animals. Any of these factors can result in excessive runoff, decreased infiltration, less delayed water storage, soil erosion, sedimentation, and streamside depredation.

A considerable amount of the water storage of this portion of Granite County is initially used for ranch irrigation. This is especially true of the watersheds on the east side of Flint Creek Range and the East Fork of Rock Creek. The watersheds feeding Georgetown Lake, Silver Lake and Warm Springs Creek furnish a particularly valuable water supply necessary for the operation of the Anaconda Company smelter serving the Butte mines. As industry increases in the area greater demands for water will prevail and the amount of controllable water available will eventually tend to set the ceiling on many phases of industry in this zone.

At the present time 18 reservoirs, constructed either under special use permit from the Forest Service or under Federal Power Commission License, store water which originates mostly on national forest lands.

The national forest lands in this county furnish big game hunting for many of the people in western Montana. The latest estimate indicates 8,600 deer, 1,470 elk, 290 moose, with an estimated number of 14,900 man-days of hunter use each year. The Rock Creek area in this county is heavily used by fishermen, picnickers and campers, approximating 45,000 man-days use annually, with an additional 71,000 man-days use by other types of recreational visitors, excluding through travelers.

SUMMARY OF IRRIGATED LAND BY RIVER BASINS IN THE FOLLOWING COUNTIES COMPLETED TO DATE

Big Horn, Broadwater, Carbon, Custer, Deer Lodge, Gallatin, Golden Valley, Granite, Jefferson, Lewis & Clark, Madison, Meagher, Musselshell, Park, Powell, Ravalli, Rosebud, Silver Bow, Stillwater, Sweet Grass, Treasure, Wheatland and Yellowstone

RIVER BASIN	Present Irrigated Acres	Irrigable Acres Under Present Facilities	Maximum Irrigable Acres
Missouri River Drainage Basin			
***Missouri River**	71,442.00	16,476.00	87,918.00
Jefferson River	61,291.00	9,713.00	71,004.00
Beaverhead River	40,771.00	6,076.00	46,847.00
Big Hole River	23,775.00	1,950.00	25,725.00
Madison River	39,445.00	7,660.00	47,105.00
Gallatin River	111,914.00	21,097.00	133,011.00
Smith River	30,304.00	18,398.00	48,702.00
Sun River	11,157.00	2,313.00	13,470.00
Musselshell River	64,789.00	57,870.00	122,659.00
Grand Total Missouri River Basin	**454,888.00**	**141,553.00**	**596,441.00**
Yellowstone River Drainage Basin			
Yellowstone River	299,053.00	96,088.00	395,141.00
Stillwater River	27,489.00	16,403.00	43,892.00
Clark Fork River	91,768.00	24,195.00	115,963.00
Big Horn River	65,395.00	25,579.00	90,974.00
Tongue River	22,137.00	7,479.00	29,616.00
Powder River	8,264.00	1,804.00	10,068.00
Grand Total Yellowstone River Basin	**514,106.00**	**171,548.00**	**685,654.00**
Columbia River Drainage Basin			
Clark Fork (Deer Lodge, Hellgate, Missoula) River	117,490.00	10,828.00	128,318.00
Bitterroot River	104,569.43	2,799.00	107,368.43
Grand Total Columbia River Basin	**222,059.43**	**13,627.00**	**235,686.43**
Grand Total in the Counties Completed to Date	**1,191,053.43**	**326,728.00**	**1,517,781.43**

*Names of streams indented on the left-hand margin indicate that they are tributaries of the first stream named above which is not indented.

IRRIGATION SUMMARY OF GRANITE COUNTY BY RIVER BASINS

	Present Irrigated Acres	Irrigable Acres Under Present Facilities	Maximum Irrigable Acres
COLUMBIA RIVER BASIN			
***Clark Fork Columbia (Hellgate) River**	1,647.00	230.00	1,877.00
Gold Creek	0	0	0
North Fork Gold Creek	209.00	0	209.00
Dunkleberg Creek	20.00	0	20.00
Perriman Slough	160.00	0	160.00
Unnamed Creek	25.00	0	25.00
Morris Creek	15.00	0	15.00
Bergman, Ackerman or Perryman Slough	232.00	64.00	296.00
Flint Creek	9,707.00	130.00	9,837.00
Ronald Gulch or Sawmill Creek	5.00	0	5.00
Summer Gulch or Spring Creek	342.00	0	342.00
Williams Spring	2.00	0	2.00
Trout Creek	370.00	13.00	383.00
Unnamed Spring	34.00	0	34.00
Wyman Creek	11.00	0	11.00
Little Trout Creek	65.00	0	65.00
Travelers Home Creek	441.00	0	441.00
Fred Burr Creek	863.00	0	863.00
Drain Ditch	123.00	0	123.00
Waste	147.00	0	147.00
Cow Creek	70.00	0	70.00
Spring Creek or Alkali Slough Creek	80.00	0	80.00
Waste Water	65.00	0	65.00
Douglas Creek	0	0	0
Frost Creek	270.00	0	270.00
Waste	10.00	0	10.00
Marshall Creek	170.00	0	170.00
Smart Creek	30.00	0	30.00
Boulder Creek	238.00	0	238.00
Girds Creek	55.00	0	55.00
Henderson Creek	65.00	0	65.00
Smart Creek	165.00	0	165.00
Byrns or Burns Creek or Spring Creek	38.00	0	38.00
Douglas Creek (McCarty)	318.00	11.00	329.00
Edgar Creek	35.00	0	35.00
Barnes Creek	120.00	100.00	220.00
Lower Willow Creek	2,735.00	40.00	2,775.00
North Fork Lower Willow Creek	76.00	0	76.00
Basin Creek	58.00	0	58.00

*Names of streams indented on the left-hand margin indicate that they are tributaries of the first stream named above which is not indented.

IRRIGATION SUMMARY OF GRANITE COUNTY BY RIVER BASINS

COLUMBIA RIVER BASIN	Present Irrigated Acres	Irrigable Acres Under Present Facilities	Maximum Irrigable Acres
West Fork or Middle Fork Lower Willow Creek	65.00	0	65.00
South Fork Lower Willow Creek	220.00	0	220.00
Copper Creek	85.00	0	85.00
Cow Creek	120.00	0	120.00
Unnamed Spring	40.00	5.00	45.00
Waste	35.00	0	35.00
Total Flint Creek and Tributaries	**17,273.00**	**299.00**	**17,572.00**
Edwards Creek	1.00	0	1.00
Lyons Fork Gulch	8.00	0	8.00
Unnamed Creek	31.00	0	31.00
Sump	173.00	0	173.00
Sump	87.00	0	87.00
Sump	13.00	0	13.00
Antelope Creek	47.00	0	47.00
Harvey Creek	165.00	64.00	229.00
Little Bear Gulch	21.00	0	21.00
Sump	109.00	0	109.00
Slough	48.00	0	48.00
Tyler or McCarthy Creek	181.00	0	181.00
Slough	62.00	0	62.00
Marcella Creek	5.00	0	5.00
Ryan Gulch	2.00	0	2.00
Gillispie Creek	0	29.00	29.00
Gratton Gulch	0	19.00	19.00
Unnamed Springs	0	13.00	13.00
Rock Creek	2,251.00	219.00	2,470.00
East Fork Rock Creek	10,069.00	562.00	10,631.00
Meadow Creek	387.00	0	387.00
Trail Creek	32.00	0	32.00
Corral Gulch	40.00	0	40.00
Middle Fork Rock Creek	188.00	161.00	349.00
Dearborn Gulch	0	28.00	28.00
Proposed Reservoir	0	10.00	10.00
Schoolmarm Gulch	7.00	0	7.00
Total East Fork Rock Creek and Tributaries	**10,723.00**	**761.00**	**11,484.00**

IRRIGATION SUMMARY OF GRANITE COUNTY BY RIVER BASINS

COLUMBIA RIVER BASIN

	Present Irrigated Acres	Irrigable Acres Under Present Facilities	Maximum Irrigable Acres
West Fork Rock Creek	100.00	0	100.00
Coal Creek	30.00	0	30.00
Beaver or Showers Creek	339.00	28.00	367.00
Unnamed Tributary to Beaver Creek	40.00	0	40.00
Ross' Fork Rock Creek	786.00	10.00	796.00
Elk Creek	20.00	0	20.00
Beaver Creek	27.00	0	27.00
Moose Meadows Creek	10.00	0	10.00
Unnamed Creek	32.00	0	32.00
Angelico Creek	57.00	0	57.00
Gilstrap Creek	218.00	0	218.00
Poison Creek	40.00	0	40.00
Total West Fork Rock Creek and Tributaries	**1,699.00**	**38.00**	**1,737.00**
Antelope Creek	15.00	0	15.00
Sluice Gulch	10.00	0	10.00
Upper Willow Creek	705.00	0	705.00
Tipperary Creek	10.00	0	10.00
Rattling Creek	9.00	0	9.00
West Rattling Creek	8.00	0	8.00
Beaver Creek	50.00	0	50.00
Bear Creek	35.00	0	35.00
Horse Canyon Creek or Horse Gulch	25.00	0	25.00
Scotchman Creek	75.00	0	75.00
Spring Creek	100.00	0	100.00
Total Upper Willow Creek and Tributaries	**1,017.00**	**0**	**1,017.00**
Stony Creek	117.00	0	117.00
Alder Creek	10.00	45.00	55.00
Wahlquist Creek	50.00	0	50.00
Eagle or Howell Creek	10.00	0	10.00
Ranch Creek	182.00	0	182.00
Brewster Creek	70.00	0	70.00
West Gulch	3.00	0	3.00
Spring Creek	2.00	4.00	6.00
Total Irrigation Columbia River Basin in Granite County	**36,693.00**	**1,785.00**	**38,478.00**

ALLENDALE IRRIGATION COMPANY

HISTORY

The formation of the Allendale Irrigation Company began on December 20, 1918, when articles of incorporation were completed for its organization. On January 2, 1919, incorporation papers were filed and recorded, and named as directors in the company were William M. Howell, John H. Bankhead, H. E. Hatch, Herschel Bullen, and Preston D. Richards.

Under terms of the charter, the Allendale Irrigation Company incorporated for a period of 40 years and issued 6,120 shares of stock, at a par value of Five ($5.00) Dollars per share.

In 1935, the State Water Conservation Board began construction of a reservoir storage project known as the Flint Creek Project on the East Fork of Rock Creek, to provide water for the supplemental irrigation of 25,000 acres of land in the Flint Creek Valley, extending from the head of the valley to Drummond which included the Allendale Canal as a part of the project.

An agreement between the Water Board and the Allendale Irrigation Company, provided for the Water Board to enlarge and extend the Allendale Canal about 4 miles below Willow Creek and to clean out and enlarge about 5 miles more of laterals. In exchange for the right-of-way of the old Allendale Canal, the Water Board agreed to furnish the water users in the Allendale Irrigation Company free water in the amount of 2,400 acre-feet during the period of May 1st to June 30th; 1,200 acre-feet from July 1st to July 15th; and 1,200 acre-feet after September 15th. During the period of July 15th to September 15th the Allendale Irrigation Company would purchase 2,000 acre-feet of water annually from the Flint Creek Storage Project under the operation of the Flint Creek Water Users's Association.

In July, 1939, a dispute arose between the Allendale Irrigation Company and the Water Board over the ownership of the return flow waters from irrigation in the Upper Flint Creek Valley and its re-use in the lower part of the valley. Since this water was a necessary part of the supply to the water purchasers in the Lower Flint Creek Valley, it was claimed by the State Water Board and the Flint Creek Water Users' Association upon the one hand, and upon the other hand, claimed by the Allendale Irrigation Company as a part of the natural flow of the stream. After some legal action in the District Court, it was decided that the Water Board would be entitled to the return flow water under its project. Extensive stream measurements and studies were carried on by the Water Board and the Flint Creek Water Users' Association to determine the normal flow of the stream and the amount of the return flow resulting from the use of project waters. One major difficulty in determining the ownership of the water was that the waters in the Upper Flint Creek Valley disappeared below the surface and reappeared again lower down on the stream.

PRESENT STATISTICS

Location: Beginning at the dividing box in the SE¼ of sec. 16, T. 10 N., R. 13 W., that part of the Allendale Canal under operation by the Allendale Irrigation Company irrigates land in the Lower Flint Creek Valley as follows: In secs. 10, 11, 12, 13, 14, 15, 22, and 23, T. 10 N., R. 13 W.; sec. 6, T. 10 N., R. 12 W.; and sec. 36, T. 11 N., R. 12W.

Length and Capacity of the Canal: The main canal of the Allendale Irrigation Company is approximately 5¼ miles in length and has a capacity of 75 cfs.

Operation and Maintenance: Total water charges, including operation and maintenance are $2.25 per acre-foot. The number of shares owned determines the amount of water alloted to each shareholder, with three shares of stock in the canal company representing 1 acre-foot of water. Approximately 87½c is charged per acre-foot for operation and maintenance under this irrigation company.

Present Users: All of the 6,120 shares of stock are active in the company, being divided among 15 water users.

Acreage Irrigated: During the irrigation season of 1958, there were 1,315 acres irrigated dependent entirely on water supplied by the Allendale Irrigation Company. There are also a total of 1,585 acres irrigated by the Allendale Irrigation Company and the Flint Creek Water Users' Association, a combination of mingled waters that cannot be determined separately as one source of water supply.

WATER RIGHT DATA

The Allendale Irrigation Company has the following water right in addition to 2,000 acre-feet of water purchased annually from the Flint Creek Water Users' Association: Appropriated by Henry A. Thayer from Flint Creek, 3,000 miner's inches dated 9-17-10. (Ref. Book 5 of Water Rights, Page 468, Clerk and Recorder's Office, Phillipsburg, Montana). (See Maps in Part II, Pages 15 and 16).

FLINT CREEK PROJECT

(Flint Creek Water Users' Association)

HISTORY

This project consists of a storage reservoir on the East Fork of Rock Creek, a main diversion canal across the divide between Flint and Trout Creeks and 4 distribution canals in the Flint Creek Valley. The storage reservoir is located about 20 miles south of Phillipsburg. Water stored in the reservoir is used for the supplemental irrigation of 25,000 acres of land along Flint Creek, extending from the head of the valley to Drummond. The drainage area above the reservoir site consists of 32 square miles of high, timbered slopes of the Continental Divide.

To construct the Flint Creek Project, the State Water Conservation Board received a loan and grant offer from the Federal government on December 31, 1935. This loan and grant offer required the formation of the Flint Creek Water Users' Association as an agency for the distribution of the water, to accumulate funds to amortize the cost of the project, and to execute a water marketing contract (see page 35) with the State Water Conservation Board.

The Flint Creek Water Users' Association was incorporated on November 9, 1935, with a capital stock of Twenty-five thousand ($25,000) Dollars, which was divided into twenty-

five thousand (25,000) shares of the par value of One ($1.00) Dollar each. Water purchase contracts (see page 35) in the amount of 25,000 acre-feet were secured and approved by the Association on May 7, 1937, and by the State Water Conservation Board on May 14, 1937.

Bids for construction of the project were divided into two separate contracts, one for the dam and one for the canal system. The low bidder on the dam was the Inland Construction Company of Omaha, Nebraska and Clifton and Applegate of Anaconda, Montana was the successful bidder for the construction of the canal system. The project was completed on November 30, 1938, and first operated during the irrigation season of 1939.

PRESENT STATISTICS

Location: The dam is located on the East Fork of Rock Creek 20 miles south of Phillipsburg. The location of the five main canals connected with the project are: (1) **Main Diversion Canal:** Diverts about one-fourth of a mile below the dam in the unsurveyed area of T. 4 N., R. 14 W. and follows a northwesterly direction to Trout Creek, which is used as a carrier for the diversion of water by the other canals in the Flint Creek Valley below. (2) **Metcalf Canal:** Has its point of diversion in the SW¼ of sec. 7, T. 5 N., R. 14 W. and follows a northerly route through sec. 5, T. 5 N., R. 14 W., secs. 31 and 32, and terminating in sec. 29, T. 6 N., R. 14 W. Lands irrigated from this canal are located in sec. 8, T. 5 N., R. 14 W. and secs. 28, 29, 31, and 32, T. 6 N., R. 14 W. (3) **Flint Creek Canal:** Point of diversion is in the NE¼ of sec. 7, T. 5 N., R. 14 W. and follows a northeasterly route through secs. 8, 5, and 4, T. 5 N., R. 14 W. and secs. 33, 34, and 27, T. 6 N., R. 14 W. where it spills into Flint Creek. Lands irrigated from this canal are in secs. 8 and 4, T. 5 N., R. 14 W.; secs. 33 and 27, T. 6 N., R. 14 W. (4) **Marshall Creek Canal:** This canal has its point of diversion in the NW¼ of sec. 33, T. 6 N., R. 14 W. and follows a northerly direction through secs. 28, 21, 15, 16, 10, 3, and 4, in T. 6 N., R. 14 W. and secs. 33, 34, 28, 21, 16, 17, where it spills into Marshall Creek in the south part of sec. 8, T. 7 N., R. 14 W. The water supplied by this canal is used to irrigate land in parts of secs. 28, 10, and 3, T. 6 N., R. 14 W. and secs. 33, 34, 27, 21, 22, 15, 16, and 17, T. 7 N., R. 14 W. (5) **Allendale Canal:** Approximately 13 miles of this canal was rebuilt and is used in the delivery of water for the Flint Creek Project. (Reference is made to the Allendale Irrigation Company for the point of diversion and location of land irrigated).

Length and Capacity of Canals: The **Main Diversion Canal** is approximately 7.7 miles long, (including a 4,050-foot, 54-inch steel pipe siphon) and has a capacity of 200 second-feet. The **Flint Creek Canal** has a length of 5.85 miles with a capacity of 63 second-feet. The **Marshall Creek Canal** has a capacity of 57 second-feet and over-all length of 16.8 miles. The **Metcalf Canal** is 4.1 miles long with a capacity of 17 second-feet. The rebuilt **Allendale Canal** system totaled about 13 miles and was enlarged to an initial capacity of 125 second-feet.

Operation and Maintenance: The total number of shares subscribed by members of the Association for the year of 1958, was 14,745. When the Flint Creek Water Users' Association was formed, water charges were established at 80c per acre-foot. After the year of 1947, water charges were increased from 80c to $1.00 on any new contracts for each acre-foot of water sold. Operation and maintenance charges will vary from year to year according to the construction repairs required for the project. In 1958 operation and maintenance

assessments were 50c per acre-foot, which are in addition to the 80c or $1.00 per acre-foot charged for water purchased. Each share of stock in the Association represents 1 acre-foot of water.

Present Users: There are 43 members purchasing water from the Flint Creek Water Users' Association of which 5 are in the Allendale Irrigation Company.

Acreage Irrigated: In 1958, there were 4,745 acres irrigated from the Flint Creek Water Users' Association and 376 acres potentially irrigable under present ditch facilities. Land irrigated by a combination of mingled waters from both the Flint Creek Water Users' Association and the Allendale Irrigation Company totals 1,585 acres. The Flint Creek Water Users' Association also furnishes water to users having private rights for the irrigation of 1,209 acres, which is a combination of mingled waters that cannot be determined separately as one source of water supply.

WATER RIGHT DATA

The State Water Conservation Board have made filings on all the unappropriated water and surplus waters from the streams listed below: From Cow Creek for the Morman Canal, date appropriated 3-18-36 (Ref. Book 19, Page 382, Water Right Records), for the Marshall Creek Canal, date appropriated 3-18-36 (Ref. Book 19, Page 373, Water Right Records); from Flint Creek and tributaries for the Fred Burr Creek Canal, date appropriated 3-18-36, for the Mormon Canal, date appropriated 3-18-36 (Ref. Book 19, Pages 376 and 378, Water Right Records); an appropriation for surface waters above from Flint Creek Canal, dated 3-18-36 (Ref. Book 19, Page 375, Water Right Records); from Fred Burr Creek for the Fred Burr Creek Canal, two (2) appropriations dated 3-18-36 (Ref. Book 19, Pages 376 and 377, Water Right Records); from Haystack Gulch and tributaries for the Marshall Creek Canal, dated 3-18-36 (Ref. Book 19, Page 372, Water Right Records); an appropriation dated 3-18-36 for surface waters above the Mormon Canal (Ref. Book 19, Page 378, Water Right Records); an appropriation dated 3-18-36 for surface waters above the Marshall Creek Canal (Ref. Book 19, Page 369, Water Right Records); from Trout Creek and tributaries, two (2) appropriations for Marshall Creek Canal and Flint Creek Canal, dated 3-18-36 (Ref. Book 19, Pages 368 and 374, Water Right Records); from the East Fork of Trout Creek and tributaries for the Flint Creek Canal, dated 3-18-36 (Ref. Book 19, Page 375, Water Right Records); from Middle Fork Willow Creek for the Mormon Canal, dated 3-18-36 (Ref. Book 19, Page 381, Water Right Records); from North Fork Willow Creek for the Mormon Canal, dated 3-18-36 (Ref. Book 19, Page 382, Water Right Records); from the South Fork Willow Creek for the Mormon Canal, dated 3-18-36 (Ref. Book 19, Page 381, Water Right Records); from an Unnamed Canal for the Main Supply Canal, dated 3-18-36 (Ref. Book 19, Page 367, Water Right Records); six (6) appropriations from Unnamed Coulees for the Marshall Creek Canal, dated 3-18-36 (Ref. Book 19, Pages 369 to 374 incl., Water Right Records); from an Unnamed Coulee, three (3) appropriations for the Mormon Canal, dated 3-18-36 (Ref. Book 19, Pages 379, 380, and 383, Water Right Records); from an Unnamed Coulee for the Fred Burr Creek Canal, dated 3-18-36 (Ref. Book 19, Page 377, Water Right Records); from an Unnamed Creek, dated 10-22-35 (Ref. Miscellaneous File C); from Douglas Creek, an appropriation for 300 miner's inches dated 6-12-44 (Ref. Miscellaneous File #44); from Flint Creek, 600 miner's inches, dated 6-12-44 (Ref. Miscellaneous File #44). All the above filings are located in the Clerk

and Recorder's Office, Phillipsburg, Montana. A decreed right from the East Fork Rock Creek, for all unappropriated surplus waters, dated 10-22-35 (Ref. Case #2107, Clerk of the District Court, Phillipsburg, Montana). (See Maps in Part II, Pages 3, 4, 5, 7, 13, 16, 18, and 19).

WATER MARKETING CONTRACT

This is an agreement between a Water Users' Association and the State Water Conservation Board on any project built or operated by the Board: whereby the Board agrees to sell to the Association all of the available water of the project, and the Association agrees to maintain the project and distribute the water to water purchasers and provides the method of payments for sums due, levying of assessments for operation and maintenance costs, notification of such levy to be given water purchasers, time of default and remedies in the event of default.

WATER PURCHASE CONTRACT

This is a three party contract entered into between the individual water purchaser, the Association and the State Water Conservation Board on any project built or operated by the Board: whereby the individual agrees to purchase a stated amount of water and to pay therefore annually a sum of money for a definite term of years; in addition to such annual sum, the individual agrees to pay such additional sum or sums as may be required annually as his proportionate share of the cost of operation and maintenance of the project. This contract is not valid until the water purchaser executes a Subscription and Pledge Agreement.

SUBSCRIPTION AND PLEDGE AGREEMENT

This is a contract between the individual water purchaser and the Water Users' Association. The purchaser agrees to buy shares of stock in the Association equal to the number of acre-feet or miner's inches of water he wishes to obtain. The water purchaser has the right to vote his shares of stock at all meetings. The stock of an Association cannot be held by anyone not having a Water Purchase Contract.

WATER RIGHT DATA — GRANITE COUNTY

APPROPRIATIONS AND DECREES BY STREAMS

STREAMS	APPROPRIATIONS (Filings of Record) No. of Filings	Miner's Inches	Cu. Ft. Per Sec.	DECREED RIGHTS Case No.	No. of Rights	Miner's Inches	Cu. Ft. Per Sec.
COLUMBIA RIVER BASIN							
*Clark Fork (Columbia							
(Deer Lodge, Hellgate) River	22	218,690	5,467.25				
Warm Springs Creek	1	All	0				
Hidden Lake	2	40	1.00				
Glen Gary Springs	1	1,000	25.00				
Dougherty Springs	1	40	1.00				
Unnamed Tributary	1	160	4.00				
West Fork or West Branch or Unnamed Tributary	5	641	16.02				
Barbich Creek	1	24,000	600.00				
Barbich Spring	1	24,000	600.00				
Cable Creek	0	0	0				
Doherty Creek	1	All	0				
Lost Creek	1	1,400	35.00				
Race Track Creek	4	10,500	262.50				
Little Race Track Creek	1	3,000	75.00				
North Fork Race Track Creek	2	6,000	150.00				
Pozega Lake Number 3	1	1,280	32.02				
Rock or Little Rock Creek	1	250	6.25				
Deer Lodge Basin Creek	5	710	17.75				
Unnamed Stream	1	500	12.50				
Gold Creek	6	3,260	81.50				
Gold Creek Lakes	4	3,000	75.00				
Rainbow Lake	1	500	12.50				
Middle Fork Gold Creek	7	2,660	66.50				
South or East Fork Gold Creek	6	5,650	141.25				
South Slope	1	300	7.50				
North Fork Gold Creek	2	2,900	72.50				
Pikes Peak Creek	0	0	0				
North Fork Pikes Peak Creek	1	200	5.00				
West Fork Pikes Peak Creek	0	0	0				
Dunkleberg Creek	3	315	7.87	2104	1	All	0
Seepage	1	40	1.00				
Unnamed Creek	1	All	0				
West Fork Dunkleberg Creek	1	40	1.00				
Unnamed Tributary	1	40	1.00				
Unnamed Spring	1	15	.37				
Hoover Creek	2	500	12.50				
South Slough	3	1,640	41.00				
Burt or Bert Creek	1	All	0	167[1]	2	All	0
Red Rock Spring	1	100	2.50				
Coberly Creek or Hollow	2	1,630	41.75				
Garret Spring	2	40	1.00				
Morris Creek	0	0	0				
Unnamed Stream	1	All	0				
Big Boulder Creek	1	All	0				
Deer Spring	1	40	1.00				
Sawmill Creek	1	200	5.00				
Spring Creek	2	200	5.00				
Bergman, Ackerman, or Perryman Slough	8	9,220	230.50				
Drummond Tunnel or Tunnel Creek	1	40	1.00	940	1	All	0

*Names of streams intended on the left-hand margin indicate that they are tributaries of the first stream named above which is not indented.

WATER RIGHT DATA — GRANITE COUNTY

APPROPRIATIONS AND DECREES BY STREAMS

STREAMS	APPROPRIATIONS (Filings of Record) No. of Filings	Miner's Inches	Cu. Ft. Per Sec.	DECREED RIGHTS Case No.	No. of Rights	Miner's Inches	Cu. Ft. Per Sec.
Flint Creek	148	274,763	6,869.07	655[2]	20	6,456.10	161.40
				719	40	12,685.00	317.12
				1151	1	150.00	3.75
Silver Hill Creek	1	200	5.00				
Grouse Creek	1	500	12.50				
Unknown Fork Flint Creek	6	1,300	32.50				
Waste Water of Flint Creek Canal	1	All	0				
North Fork Flint Creek	28	20,806	520.15				
Fair Lake	1	576	14.40				
Unnamed Creek	1	40	1.00				
Red Lion Spring	1	40	1.00				
Unnamed Spring	1	40	1.00				
Fair Stake Creek	1	576	14.40				
West Fork North Fork Flint Creek or Echo Lake Creek	9	7,350	183.75				
Brain Lake	2	920	23.00				
Unnamed Stream	1	2,400	60.00				
Blodget Creek	2	400	10.00				
Georgetown Lake	1	600	15.00				
Unnamed Creek	1	40	1.00				
Sawmill Creek	2	540	13.50				
Fessler Spring and Creek	1	40	1.00				
Trout, Big Trout or Little Trout Creek	16	1,980	49.50	573	3	362.00	9.05
Main Supply Canal	1	All	0				
Willow Spring	1	40	1.00				
Gleacean Creek	2	80	2.00				
Neitz's Creek	1	40	1.00				
East Fork Trout Creek or Wyman Creek	4	14,580	364.50	1657	2	145.00	3.62
Lunn Spring	1	5	.12				
Travelers Home Creek	3	800	20.00				
Tee Bar Three Ranch Spring Creek	1	200	5.00				
Unnamed Creek	1	100	2.50				
Summer, Spring, Degenhart or Lloyd Creek	8	2,330	58.25	578	1	50.00	1.25
Basin Creek	5	620	15.50				
Fred Burr Creek	20	10,700	267.50	702	5	4,925.00	123.12
Upper Fred Burr Lake	0	0	0	702	(See Fred Burr Creek)		
Lower Fred Burr Lake	2	2,100	52.50	702	(See Fred Burr Creek)		
Camp or Horton Creek or Gulch	4	200	5.00	702	(See Fred Burr Creek)		
Unnamed Spring	1	100	2.50				
White Rock Gulch Creek	1	50	1.25	702	(See Fred Burr Creek)		
Gypsy Gulch Creek	1	50	1.25	702	(See Fred Burr Creek)		
Bluff Springs	1	50	1.25				
Fred Burr Gulch	1	150	3.75				
Scott Gulch Creek	1	50	1.25	702	(See Fred Burr Creek)		
North Fork Fred Burr Creek	1	300	7.50				
South Fork Fred Burr Creek	5	1,400	35.00				
Unnamed Stream	1	150	3.75	702	(See Fred Burr Creek)		
Unnamed Spring	1	150	3.75				
Unnamed Coulee	1	All	0	702	(See Fred Burr Creek)		
Number 25 Spring	1	50	1.25	702	(See Fred Burr Creek)		

WATER RIGHT DATA — GRANITE COUNTY

APPROPRIATIONS AND DECREES BY STREAMS

STREAMS	APPROPRIATIONS (Filings of Record) No. of Filings	Miner's Inches	Cu. Ft. Per Sec.	DECREED RIGHTS Case No.	No. of Rights	Miner's Inches	Cu. Ft. Per Sec.
Number 24 Spring	1	50	1.25	702	(See Fred Burr Creek)		
Number 23 Spring	1	50	1.25	702	(See Fred Burr Creek)		
Number 22 Spring	1	50	1.25	702	(See Fred Burr Creek)		
Number 21 Spring	1	50	1.25	702	(See Fred Burr Creek)		
Number 20 Spring	1	50	1.25	702	(See Fred Burr Creek)		
Number 19 Spring	1	50	1.25	702	(See Fred Burr Creek)		
Number 18 Spring	1	50	1.25	702	(See Fred Burr Creek)		
Number 17 Spring	1	50	1.25	702	(See Fred Burr Creek)		
Number 16 Spring	1	50	1.25	702	(See Fred Burr Creek)		
Number 15 Spring	1	50	1.25	702	(See Fred Burr Creek)		
Number 14 Spring	1	50	1.25	702	(See Fred Burr Creek)		
Number 11 Spring	1	50	1.25	702	(See Fred Burr Creek)		
Number 9½ Spring	1	50	1.25	702	(See Fred Burr Creek)		
Number 9 Spring	1	50	1.25	702	(See Fred Burr Creek)		
Number 8 Spring	1	50	1.25	702	(See Fred Burr Creek)		
Number 4 Spring	1	50	1.25	702	(See Fred Burr Creek)		
Number 3 Spring	1	100	2.50	702	(See Fred Burr Creek)		
Coulter Creek	0	0	0				
East Fork Coulter Creek	2	700	17.50				
Dirty Dick Creek	7	550	13.75				
Lake Spring Creek	1	100	2.50				
Sunny Spring	1	40	1.00				
Cow Creek	5	600	15.00				
Unnamed Spring	1	40	1.00				
Alkali Slough Creek or Spring Creek	1	50	1.25	419[3]	1	50.00	1.25
Douglas Creek	10	1,954	48.85				
Northeast Fork Douglas Creek	1	250	6.25				
Frost Creek or Gulch	22	1,801	45.02	2276	1	All	0
Klammath Creek	5	1,100	27.50				
South Fork Frost Creek	5	150	3.75				
North Fork Frost Creek	1	15	.37				
Northeast Fork Frost Creek or Hickory Creek	1	All	0				
Unnamed Gulch	1	200	5.00				
Bradshaw Spring	1	100	2.50				
A Spring	1	2,000	50.00				
Canyon Creek	3	All	0				
Unnamed Spring	1	All	0				
Spring Creek	5	560	14.00				
Bath House Creek or Capron Creek	4	2,660	66.50				
Unnamed Creek	1	All	0				
Kraemer Creek	1	160	4.00				
Camp Creek	16	3,100	77.50				
Unnamed Springs	1	10	.25				
Franklin Gulch	1	100	2.50				
North Fork Camp Creek	1	200	5.00				
South Fork Camp Creek	1	All	0				
Short Creek	1	50	1.25				
Unnamed Springs	4	190	4.75				
Cow Spring	1	40	1.00				
Stewart or Stuart Creek or Gulch	9	1,940	48.50				
Brown's Gulch	6	155	3.87				
Chalcadonia Tunnel	1	25	.62				
Marshall Creek	6	1,190	29.75				
Peter Davis Spring	1	20	.50				

WATER RIGHT DATA — GRANITE COUNTY

APPROPRIATIONS AND DECREES BY STREAMS

STREAMS	APPROPRIATIONS (Filings of Record) No. of Filings	Miner's Inches	Cu. Ft. Per Sec.	DECREED RIGHTS Case No.	No. of Rights	Miner's Inches	Cu. Ft. Per Sec.
Mountain Creek	1	240	6.00				
Phelps Spring	1	40	1.00				
Unnamed Springs	3	640	16.00				
Unnamed Creek	1	All	0				
Marshall Creek Canal	7	All	0				
Henri Spring	1	40	1.00				
Unnamed Branch Marshall Creek	1	All	0				
Unnamed Springs	2	All	0				
Sawmill Creek	1	40	1.00				
Unnamed Spring	1	100	2.50				
Sloppy Joe Creek	1	50	1.25				
Unnamed Stream	2	160	4.00				
Davis Spring	1	40	1.00				
Boulder Creek	49	43,967	1,099.17	719	(See Flint Creek)		
Granite Creek	3	750	18.75				
Royal or Royal Gold Creek	3	900	22.50				
Altoona or Twin Lakes	2	340	8.50				
Unnamed Springs	2	75	1.87				
Copper Creek or West Fork North Fork Boulder Creek	5	1,530	38.25				
Brown's Gulch Spring	1	75	1.87				
Little Gold Creek	13	7,510	187.75				
Capron Springs	1	.4	.01				
Unnamed Spring	2	80	2.00				
Princeton Creek or Gulch	11	3,450	86.25				
Amos Gulch	4	520	13.00				
Unnamed Tributaries	1	300	7.50				
Big Spring	1	560	14.00				
Swamp Creek	4	1,590	39.75				
Tigress Creek	3	1,200	30.00				
East Fork South Fork or South Fork Boulder Creek or Clear Creek	10	4,650	116.25	719	(See Flint Creek)		
Unnamed Stream	1	480	12.00				
Stewart Lake	4	1,900	47.50				
Wyman Creek or West Fork South Fork Boulder Creek	5	2,840	71.00	719	(See Flint Creek)		
Avaenmine Spring	1	10	.25				
Mountain Gem Gulch and Lake	1	100	2.50				
Summit Gulch	1	180	4.50				
Unnamed Spring	1	All	0				
Spring Gulch	1	80	2.00				
Piquet Gulch	1	10	.25				
Unnamed Spring	1	10	.25				
Unnamed Creek	1	40	1.00				
Girds Creek	9	1,370	34.25	719	(See Flint Creek)		
Stone Drain Ditch	1	500	12.50				
Henderson Creek	17	2,460	61.50				
Unnamed Spring	1	100	2.50				
First Left Hand Fork Henderson Creek	1	50	1.25				
First Right Hand Fork Henderson Creek	1	50	1.25				
Unnamed Spring	1	100	2.50				
Dredge Pond	1	75	1.87				

WATER RIGHT DATA — GRANITE COUNTY

APPROPRIATIONS AND DECREES BY STREAMS

STREAMS	APPROPRIATIONS (Filings of Record) No. of Filings	Miner's Inches	Cu. Ft. Per Sec.	DECREED RIGHTS Case No.	No. of Rights	Miner's Inches	Cu. Ft. Per Sec.
Unnamed Spring	1	30	.75				
Smart Creek	9	5,752	143.80	719	(See Flint Creek)		
Unnamed Spring	1	25	.62	719	(See Flint Creek)		
Hangman Gulch	1	40	1.00				
Unnamed Creek	1	100	2.50				
Burns, Byrne or Spring Creek	3	115	2.87				
Daley Spring	1	40	1.00				
Unnamed Spring	1	100	2.50				
Douglas or McCarty Creek	8	1,490	37.25	719	(See Flint Creek)		
Bear Creek	1	200	5.00				
Edgar Creek	2	100	2.50				
Yellow Jacket Creek	1	200	5.00				
Unnamed Spring	1	120	3.00				
Southeast Lake Gulch	1	150	3.75				
Unnamed Spring	1	20	.50				
Unnamed Spring	1	300	7.50				
Barnes Creek	5	1,150	28.75	719	(See Flint Creek)		
Gaskill Creek	0	0	0				
Unnamed Spring	1	100	2.50				
Unnamed Stream	2	80	2.00				
Herd Horse or Herd House Creek	3	220	5.50				
Lower Willow Creek	30	11,000	275.00	1208	2	125.00	3.12
				719	(See Flint Creek)		
				80	20	3,735.00	93.37
				880	1	60.00	1.50
				1837	1	150.00	3.75
North or Northwest Fork Lower Willow Creek	5	10,200	255.00				
Goose Gulch	0	0	0				
Green Mountain Spring	1	.4	.01				
Miller Gulch Spring	1	.4	.01				
Middle or West Fork Lower Willow Creek	4	1,200	30.00				
Senia Creek	1	All	0				
Swamp Springs	2	240	6.00				
Spring Creek	0	0	0				
Hill Top Placer Mine Spring	1	100	2.50				
South Fork or East Branch Lower Willow Creek	7	3,060	76.50				
Bell Creek	1	100	2.50				
Unnamed Spring	1	All	0				
Copper or Copper Queen Creek	2	360	9.00				
Unnamed Spring	1	25	.62				
Anderson Creek	1	100	2.50				
Unnamed Spring	2	20	.50				
Gaylord Creek	2	180	4.50				
Cottonwood Creek	1	600	15.00				
Dry Gulch	3	720	18.00				
Subterranean Waters	1	200	5.00				
Unnamed Springs	9	1,180	29.50				
Drain Ditch	2	1,040	26.00				
Unnamed Creek	3	240	6.00				
Cow Creek	9	1,675	41.87	486	1	50.00	1.25
				675	2	25.00	.62
				1253	2	442.00	11.05
Unnamed Spring	1	30	.75				

WATER RIGHT DATA — GRANITE COUNTY

APPROPRIATIONS AND DECREES BY STREAMS

STREAMS	APPROPRIATIONS (Filings of Record) No. of Filings	Miner's Inches	Cu. Ft. Per Sec.	DECREED RIGHTS Case No.	No. of Rights	Miner's Inches	Cu. Ft. Per Sec.
Harvey or Eight Mile Divide Spring	2	1.2	.03				
Calf Creek	1	200	5.00				
Spring & Flood Water	1	240	6.00				
Unnamed Spring	1	All	0				
Unnamed Spring	1	50	1.25				
Unnamed Stream	1	300	7.50				
Carten Creek	1	30	.75				
Unnamed Spring	1	50	1.25				
Messenger Creek	1	100	2.50				
Unnamed Springs	1	200	5.00				
Sawmill Gulch	1	10	.25				
Sinking Creek	1	320	8.00				
Spring Creek	1	All	0				
Deer or Peer Creek	2	100	2.50				
Lion Gulch	1	All	0				
Edwards Creek	0	0	0	1089	5	27.00	.67
Jones Creek	1	100	2.50				
Unnamed Spring	1	0	0				
Unnamed Stream	1	200	5.00				
Mormon Canal	4	All	0				
Lyons Gulch	1	80	2.00				
Mud Creek	1	25	.62				
Alkali Gulch	1	100	2.50				
Talbott Gulch	1	All	0				
Unnamed Creek	1	160	4.00				
Unnamed Spring	2	150	3.75				
Calf Hollow	1	80	2.00				
Cattle Hill Spring	1	160	4.00				
Spring Gulch	1	All	0				
Tigh Creek	0	0	0				
Unnamed Springs	1	50	1.25				
Rattler Creek	3	550	13.75				
Unnamed Spring	1	40	1.00				
Mulky Gulch	1	140	3.50				
Water Gulch	1	150	3.75				
May Day Spring and Stream	1	120	3.00				
Mulky Springs	1	100	2.50				
Cyclone Gulch or Williams Creek	2	75	1.87				
Frenchy Creek	1	25	.62				
Warm Springs Creek	3	500	12.50				
East Warm Springs	1	500	12.50				
South Warm Springs	1	200	5.00				
Unnamed Springs	1	All	0				
Upper 3 Warm Springs	1	400	10.00				
Lower Warm Springs	1	300	7.50				
3 Warm Springs	1	300	7.50				
Bearmouth Warm Springs	2	300	7.50				
Bear Creek or Gulch	16	3,700	92.50	1211	2	110.00	2.75
Kernans Fork, Kerns Gulch, or North Fork Bear Creek	7	2,000	50.00				
Tributary to North Fork Bear Gulch	1	All	0				
Unnamed Springs	1	All	0				
Bear Gulch Spring	1	400	10.00				
Unnamed Creek	1	160	4.00				
First Chance Gulch or Creek	5	186	4.65				

WATER RIGHT DATA — GRANITE COUNTY

APPROPRIATIONS AND DECREES BY STREAMS

STREAMS	APPROPRIATIONS (Filings of Record) No. of Filings	Miner's Inches	Cu. Ft. Per Sec.	DECREED RIGHTS Case No.	No. of Rights	Miner's Inches	Cu. Ft. Per Sec.
South Fork First Chance Gulch or Creek	1	All	0				
Williams Creek	3	20	.50				
McMannis or McMamms Gulch	2	All	0				
Unnamed Springs	2	All	0				
Deep Creek or Gulch	12	1,090	27.25	2336	1	All	0
Unnamed Springs	2	100	2.50				
Seggard Springs	1	100	2.50				
Shores Creek	1	400	10.00				
Unnamed Springs	3	All	0				
Cayuse Gulch Creek or State or Slate Creek	9	670	16.75				
Gambler Gulch	0	0	0				
Unnamed Spring	1	40	1.00				
Unnamed Creek	1	100	2.50				
Springtown Spring and Creek	1	100	2.50				
Warm Springs	1	100	2.50				
Secret Gulch Creek	2	4,300	107.50				
Ten Mile Creek	4	900	22.50				
Klondike Gulch	1	All	0				
Baldy Creek or Gulch	2	550	13.75				
Phelan Gulch	0	0	0				
Susquehanna Creek	1	All	0				
Unnamed Spring	1	50	1.25				
Unnamed Waters	1	200	5.00				
Schimmahorn Gulch	1	All	0				
Cunningham Gulch	1	All	0				
Saw Pit Gulch	2	50	1.25				
Oliver Gulch	1	12	.30				
Lyons Fork Gulch	1	All	0				
Johnathon or Jonathon Spring Creek or Gulch	3	250	6.25				
Johnathon Spring	1	100	2.50				
Home Stake or House Gulch	1	100	2.50				
Herricks Gulch	1	All	0				
Stone Gulch	1	100	2.50				
Hot Springs Creek	2	400	10.00				
Mud Springs	1	All	0				
Wood Creek	0	0	0				
Pepper Jack Spring	1	10	.25				
Antelope or John Lannen's Creek	3	All	0				
Jungle Spring	1	10	.25				
John's Gulch Spring	1	100	2.50				
Birmingham Creek	1	150	3.75				
Unnamed Spring	1	12	.30				
Good Luck Gulch	1	50	1.25				
Harvey Creek	29	26,345	658.62				
Eight Mile Creek	3	2,560	64.00				
Ventura Gulch	0	0	0				
Section 18 Spring	1	.4	.01				
Komick Gulch	0	0	0				
Emminger Spring	1	40	1.00				
McKnights Gulch	1	50	1.25				
South Fork Harvey Creek	1	500	12.50				
West Fork Harvey Creek	1	200	5.00				
Little Bear Creek	2	30	.75				

WATER RIGHT DATA — GRANITE COUNTY

APPROPRIATIONS AND DECREES BY STREAMS

STREAMS	APPROPRIATIONS (Filings of Record) No. of Filings	Miner's Inches	Cu. Ft. Per Sec.	DECREED RIGHTS Case No.	No. of Rights	Miner's Inches	Cu. Ft. Per Sec.
Unnamed Springs and Seepage	1	300	7.50				
Tyler Creek or McCarthy	2	1,500	37.50	1685	3	530.00	13.25
Byrne Spring	1	200	5.00				
Unnamed Springs	3	700	17.50				
Pine Grove	3	250	6.25				
Gillispie Creek	2	2,800	70.00				
Camas Creek	1	100	2.50				
Welsh or Bateman Creek	3	2,800	70.00				
Unnamed Spring and High Water	1	200	5.00				
Rock, Big Rock, or Stony Creek	91	1,135,623	28,390.57				
East (Right) Fork Rock Creek	34	40,140	1,003.50	2107	8	2,561.00	64.02
Sauers Creek	1	160	4.00				
Elk Creek	0	0	0				
Dry Creek	1	300	7.50				
Cascade Creek	1	60	1.50				
Meadow Creek	8	4,540	113.50	2107	(See East Fork Rock Cr.)		
South Fork Meadow Creek	1	1,000	25.00				
Dry Fork Meadow Creek	1	500	12.50				
Eau De Vie Spring	1	20	.50				
Trail Creek	3	1,190	29.75				
Spring Creek	2	155	3.87				
Corral Gulch	1	40	1.00				
Middle Fork Rock Creek	21	15,476	386.90				
Carp Creek	1	1,000	25.00				
Copper Creek	0	0	0				
Frog Pond (Frog Pond Basin, Swead) Creek	7	4,880	122.00				
Unnamed Springs	4	400	10.00				
Unnamed Spring	1	All	0				
Mack Creek	1	100	2.50				
Brook or Creek	1	200	5.00				
Senate Creek	0	0	0				
Kaiser Creek	1	240	6.00				
Kaiser Lake	2	700	17.50				
Unnamed Spring	1	100	2.50				
Dearborn Gulch	1	80	2.00				
Little Middle Fork Rock Creek	1	1,000	25.00				
West Fork Rock Creek	22	28,080	702.00				
North Fork West Fork Rock Creek	5	2,900	72.50				
Crystal Creek	2	400	10.00				
East Branch North Fork West Fork Rock Creek	1	500	12.50				
Fuse Creek	0	0	0				
Fusy (Fuse) Lake	1	340	8.50				
West Fork Fuzz or Fuse Creek	2	160	4.00				
Duncie Creek	2	600	15.00				
South Fork Duncie Creek	1	100	2.50				
West Fork Duncie Creek	2	160	4.00				
Coal Creek	1	160	4.00				
North Fork Coal Creek	2	400	10.00				

WATER RIGHT DATA — GRANITE COUNTY

APPROPRIATIONS AND DECREES BY STREAMS

STREAMS	APPROPRIATIONS (Filings of Record) No. of Filings	Miner's Inches	Cu. Ft. Per Sec.	DECREED RIGHTS Case No.	No. of Rights	Miner's Inches	Cu. Ft. Per Sec.
Middle Fork Coal Creek	1	200	5.00				
South Fork Coal Creek	1	200	5.00				
Anaconda Gulch	1	240	6.00				
Spring Gulch Creek	1	200	5.00				
Moss Creek	1	300	7.50				
Sapphire or Cornish Gulch	5	1,120	28.00				
West Fork Spring	2	120	3.00				
Hull Creek	1	100	2.50				
Gem Creek	2	80	2.00				
North Fork Gem Creek	2	80	2.00				
Timber Creek	1	500	12.50				
Beaver or Little Beaver or Showers Creek	3	1,240	31.00	1255	2	730.00	18.25
Beaver Dam Springs	2	600	15.00				
Maukey, Makay, or May Kaye Gulch	2	360	9.00				
Ross' Fork Rock Creek	14	12,800	320.00				
Mosquito Creek	2	120	3.00				
Falls Creek	2	3,500	87.50				
South Fork Ross Creek	0	0	0				
Bagdad Creek	1	400	10.00				
Moose or Big Moose Creek or Gulch	3	5,560	139.00				
Three Springs	1	400	10.00				
Forsman Creek	1	100	2.50				
Angelico Creek	2	200	5.00				
Gilstrap or Helm Creek	4	2,064	51.60	1774 7442[4]	2	475.00	11.87
Unnamed Springs	3	90	2.25				
Willow Creek	1	500	12.50				
Spruce Creek	2	80	2.00				
Brady Creek	2	2,000	50.00				
Queener Creek	2	160	4.00				
Mullet's Creek	1	50	1.25				
Antelope Creek or Gulch	5	1,000	25.00				
Unnamed Spring	1	40	1.00				
South Fork Antelope Creek	1	50	1.25				
Unnamed Spring	1	40	1.00				
Dry Gulch Spring	1	4	.10				
Pullar Creek	1	100	2.50				
Grizzly Creek	1	100	2.50				
Montgomery Creek or Gulch	2	400	10.00				
Sluice Gulch	5	330	8.25				
North Branch Sluice Creek	1	80	2.00				
Mill Creek	1	100	2.50				
Upper Willow Creek or Morses Fork	19	5,144	128.60				
Filo or Philo (Shilo) Creek	6	4,100	102.50				
McDermott Creek	3	880	22.00				
Rattling Creek	1	432	10.80				
Beaver Creek	5	1,360	34.00				
Fall Gulch Creek	1	500	12.50				
Bear Creek	1	200	5.00				
Scotchman's Creek	2	240	6.00	1070	2	50.00	1.25
Alder Creek or Gulch	4	885	22.12				
Niles Creek	1	40	1.00				
Arbuckle, Buckle, or Mill Hill Creek	2	325	8.12				

WATER RIGHT DATA — GRANITE COUNTY

APPROPRIATIONS AND DECREES BY STREAMS

STREAMS	APPROPRIATIONS (Filings of Record) No. of Filings	Miner's Inches	Cu. Ft. Per Sec.	DECREED RIGHTS Case No.	No. of Rights	Miner's Inches	Cu. Ft. Per Sec.
Little Arbuckle Creek	1	40	1.00				
Unnamed Spring	1	40	1.00				
Miners Creek or Gulch	6	2,662	66.55				
Horse Canyon or Gulch	3	700	17.50	933	1	75.00	1.87
Horse Gulch Spring	1	40	1.00				
East Fork Horse Gulch	1	100	2.50				
Luthje Creek	1	100	2.50				
Sheep Gulch	1	80	2.00				
Unnamed Spring	1	100	2.50				
Unnamed Spring	1	50	1.25				
Scotchman Creek	1	500	12.50				
Spring Creek	4	900	22.50				
Little Gulch	1	100	2.50				
Cornich (Cornish) Gulch	1	400	10.00				
Sophie Creek or Basin Gulch	1	300	7.50				
Quartz Gulch	5	1,700	42.50				
Stony Creek	21	27,160	679.00				
Stony Lake	1	200	5.00				
Unnamed Creek	2	40	1.00				
North Fork Stony Creek	2	600	15.00				
Divide Creek	0	0	0				
West Fork Divide Creek	1	40	1.00				
Lowry Creek	0	0	0				
West Fork Lowry Creek	2	320	8.00				
West Fork Stony Creek	0	0	0				
Number 1 Creek	1	120	3.00				
Number 3 Creek	1	240	6.00				
Number 4 Creek	1	80	2.00				
Branch West Fork Stony Creek	0	0	0				
Number 2 Creek	1	80	2.00				
Windlass Gulch	2	260	6.50				
Big Horn Spring	1	.8	.02				
Williams Creek Gulch	5	1,780	44.50				
Fisher Jack Springs	1	.4	.01				
Hog Back Creek	1	800	20.00				
Wahlquist Creek	0	0	0				
Lost Creek	1	300	7.50				
Eagle (Howell) Creek	1	75	1.87				
Harry's Flat Gulch	0	0	0				
Harry's Flat Gulch Spring	1	.8	.02				
Welcome Creek	4	3,040	76.00				
Ranch Creek	12	26,530	663.25				
Elkhorn Creek	0	0	0				
Elkhorn Spring	1	80	2.00				
Grizzly Gulch	1	200	5.00				
Grizzly Spring	1	.8	.02				
Voght Creek	1	All	0				
Unnamed Spring	1	40	1.00				
Brewster Creek	24	7,200	180.00				
North Fork Brewster Creek	5	1,780	44.50				
Lodgepole Springs	1	.4	.01				
Eddleman Creek	1	160	4.00				
West or South Fork Brewster Creek	8	1,900	47.50				
Spring Creek or Gulch	2	125	3.12				
East Fork Brewster Creek	6	960	24.00				
Fourth of July Gulch	1	40	1.00				

WATER RIGHT DATA — GRANITE COUNTY

APPROPRIATIONS AND DECREES BY STREAMS

STREAMS	APPROPRIATIONS (Filings of Record) No. of Filings	Miner's Inches	Cu. Ft. Per Sec.	DECREED RIGHTS Case No.	No. of Rights	Miner's Inches	Cu. Ft. Per Sec.
Half Mile Creek	1	100	2.50				
Unnamed Spring	1	All	0				
Goat Creek	0	0	0				
Goat Gulch Spring	1	.4	.01				
Spring Creek	1	120	3.00				
Babcock or Low Creek	3	210.8	5.27				
Horse Pasture Spring	1	.8	.02				
Red Bottom Creek	1	100	2.50				
Kitchen Gulch	0	0	0				
Kitchen Gulch Spring #2	1	.4	.01				
Colma Gulch	0	0	0				
Kitchen Gulch Spring #1	1	.4	.01				
Unnamed Branch Rock Creek	5	1,250	31.25				
Spring Creek	1	50	1.25				
Lake Spring	1	260	6.50				
Rust Creek	1	500	12.50				
Lost Horse Creek	1	160	4.00				
Unnamed Tributary to Hellgate River	1	150	3.75				
TOTAL	1,626	2,252,679.8	56,316.92		132	33,968.10	849.17

[1] Burt Creek Decree Recorded and Filed in Deer Lodge County Court House.

[2] Flint Creek Decree (Case #655) is recorded in the Federal Court House in Helena, Montana and Filed in the National Archives and Record Service, Naval Air Station, Seattle 15, Washington.

[3] Spring Creek or Alkali Slough Creek Decree Recorded and Filed in Deer Lodge County Court House.

[4] Case #1774 was changed by Case #7442. Case #1774 is Recorded and Filed in the Granite County Court House. Case #7442 is Recorded and Filed in the Federal Court House at Helena, Montana.

WATER RIGHT DATA — GRANITE COUNTY

APPROPRIATIONS AND DECREES BY STREAMS

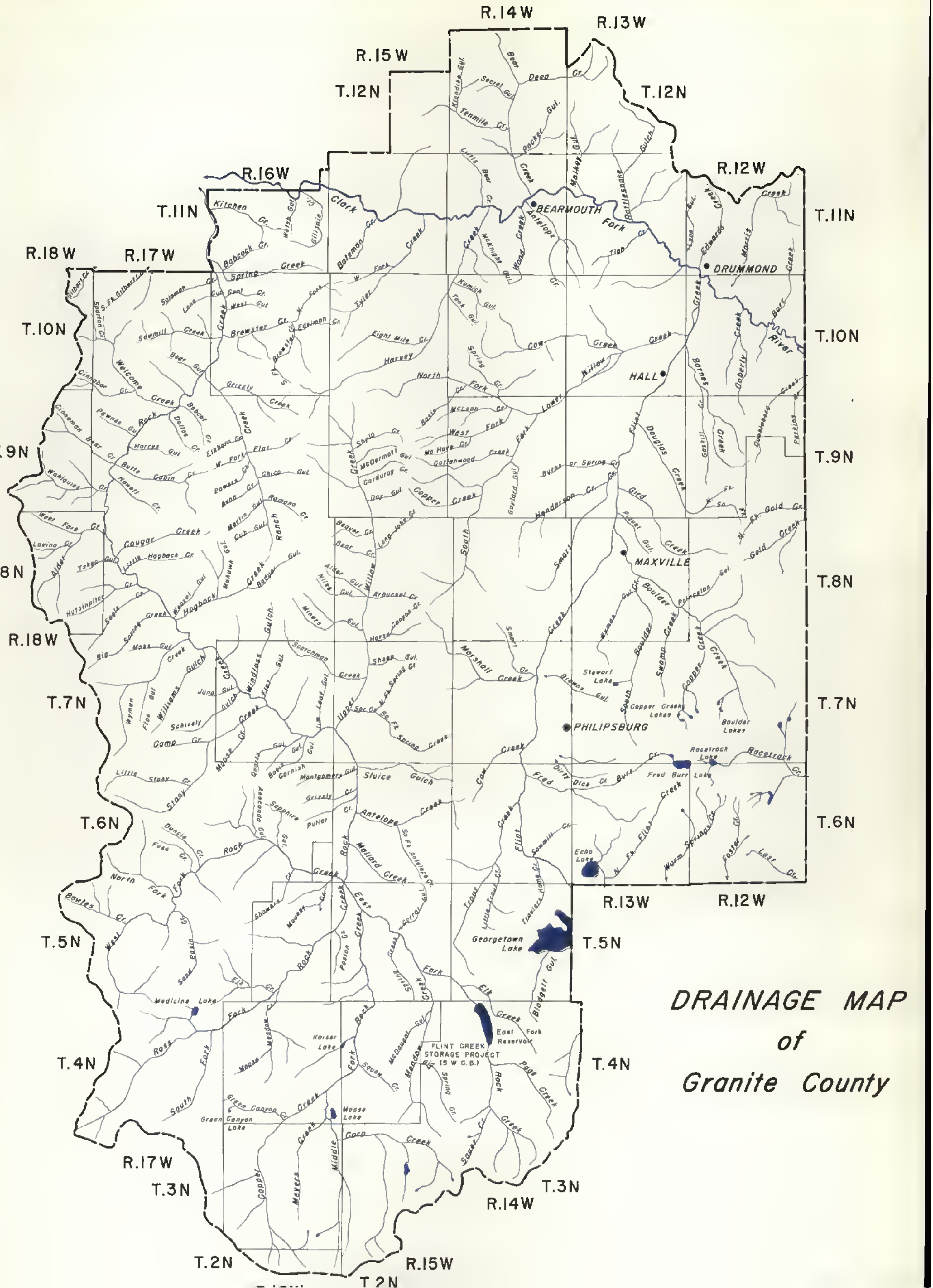
STREAMS	APPROPRIATIONS (Filings of Record) No. of Filings	Miner's Inches	DECREED RIGHTS Cu. Ft. Per Sec.
DRAINAGES IN GRANITE COUNTY NOT LOCATED			
Cedar Springs	1	25	.62
Charcoal Creek	1	500	12.50
Clear Water Springs	1	All	0
Dick Knowles Creek	1	100	2.50
Dunc Camel Creek	1	100	2.50
Dupy Creek	1	100	2.50
East Fork Montana Creek	1	500	12.50
Easton Gulch	1	100	2.50
Eldorado Creek	1	500	12.50
Fannie Darnell Creek	1	2,000	50.00
Fourth of July Spring	2	240	6.00
Frazier Spring	1	30	.75
Funk Spring	2	72	1.80
Hope Gulch	1	All	0
Jamieson Spring	2	400	10.00
Little Hazel Spring	1	20	.50
Little Run Creek	1	1,000	25.00
North Owl Flat Spring	1	50	1.25
Naylor Spring	1	40	1.00
Pine Spring	1	50	1.25
Placer Creek	1	40	1.00
Rabbit Creek	1	40	1.00
Ram Cat Gulch	1	30	.75
Seepage	1	400	10.00
Sicord Gulch	1	50	1.25
Simon Gulch	1	10	.25
South Owl Flat Spring	1	50	1.25
Spring Creek or Gulch	13	1,332	33.30
Startz Gulch	1	20	.50
Stewart Gulch Spring	1	2,000	50.00
Swartz Creek	1	150	3.75
Toby Gulch	1	50	1.25
Unknown and Unnamed Creeks	10	4,204	105.10
Unnamed Lake	1	All	0
Unnamed Springs	26	3,367	84.17
Warrens Creek	4	650	16.25
Wet Gulch	1	100	2.50
TOTAL	89	18,320	457.99

WATER RESOURCES SURVEY

Granite County, Montana

Part II
Maps Showing Irrigated Areas

Pubished by
STATE ENGINEER'S OFFICE
Helena, Montana
June, 1959



DRAINAGE MAP of Granite County

MAP INDEX

MAP SYMBOL INDEX

BOUNDARIES

- COUNTY LINE
- NATIONAL FOREST LINE

DITCHES

- CANALS OR DITCHES
- DRAIN DITCHES
- PROPOSED DITCHES

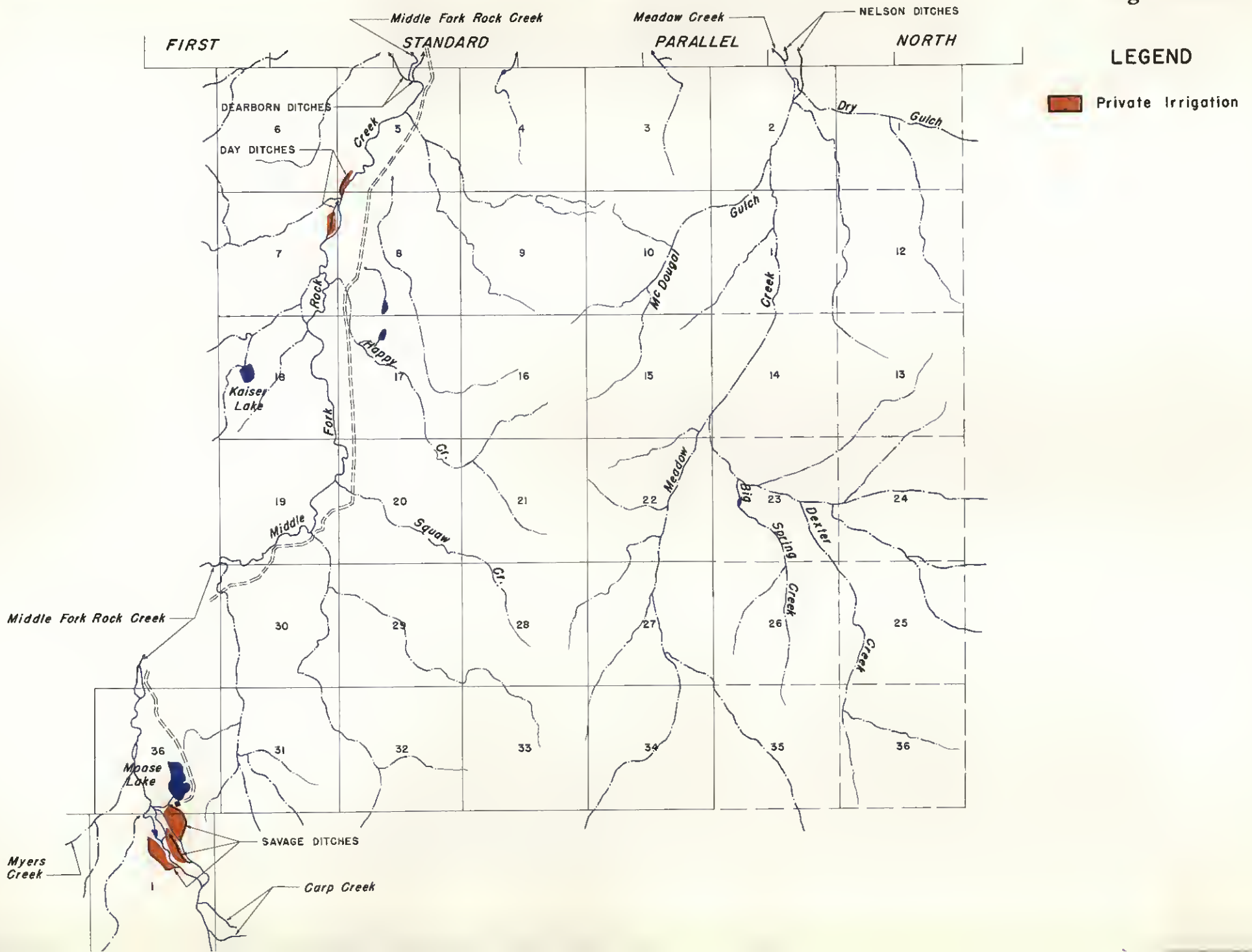
TRANSPORTATION

- PAVED ROADS
- UNPAVED ROADS
- RAILROADS
- STATE HIGHWAY
- U.S. HIGHWAY
- AIRPORT

STRUCTURES & UNITS

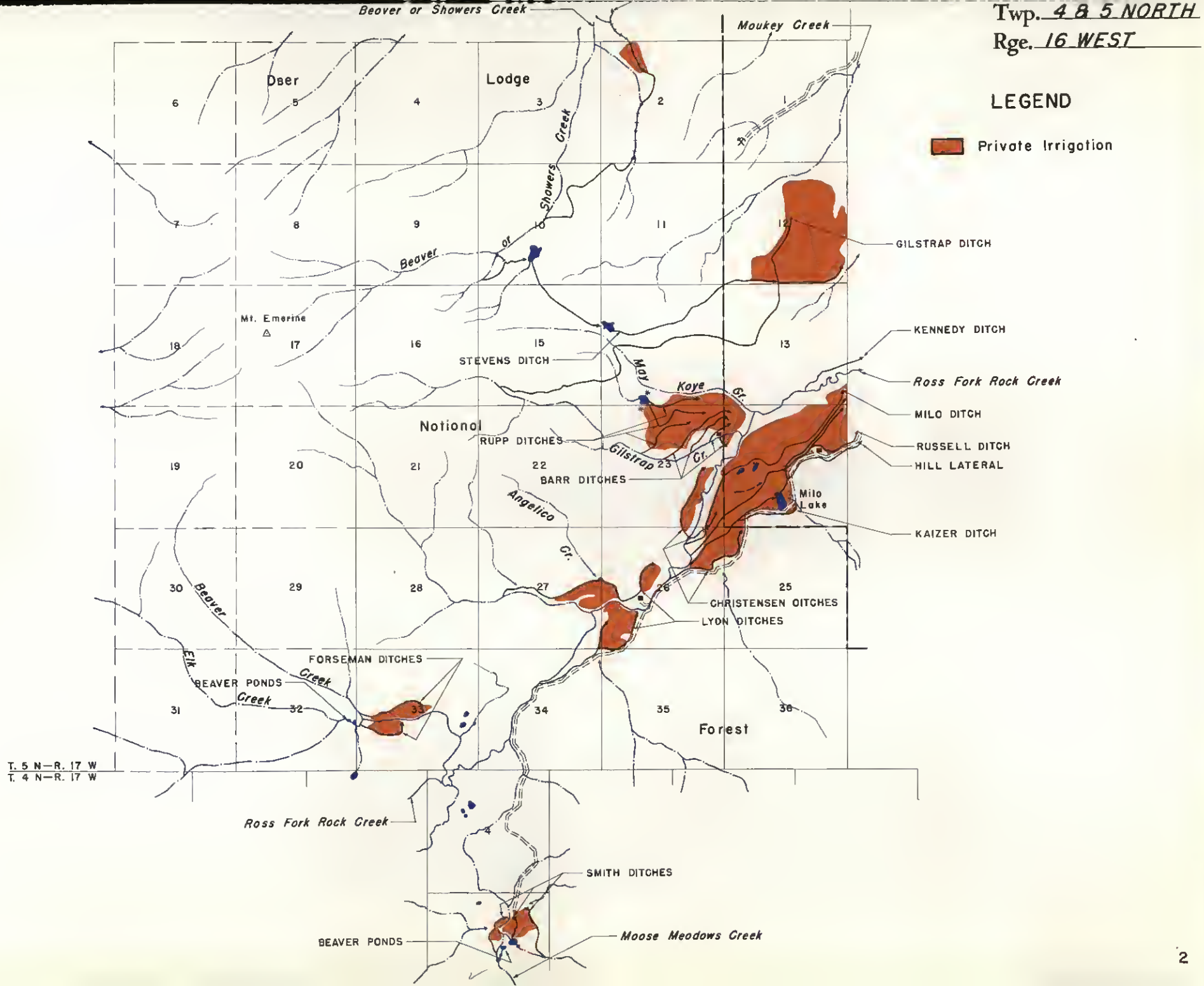
- DAM
- DIKE
- FLUME
- SIPHON
- SPILL
- SPRINKLER SYSTEM
- WEIR
- PIPE LINE
- PUMP
- PUMP SITE
- RESERVOIR
- WELL
- NATURAL CARRIER USED AS DITCH
- SPRING
- SWAMP
- GAUGING STATION
- POWER PLANT
- STORAGE TANK
- CEMETERY
- FAIRGROUND
- FARM OR RANCH UNIT
- LOOKOUT STATION
- RANGER STATION
- RAILROAD TUNNEL
- SCHOOL
- SHAFT, MINE, OR DRIFT

Twp. 4 NORTH
Rge. 15 WEST

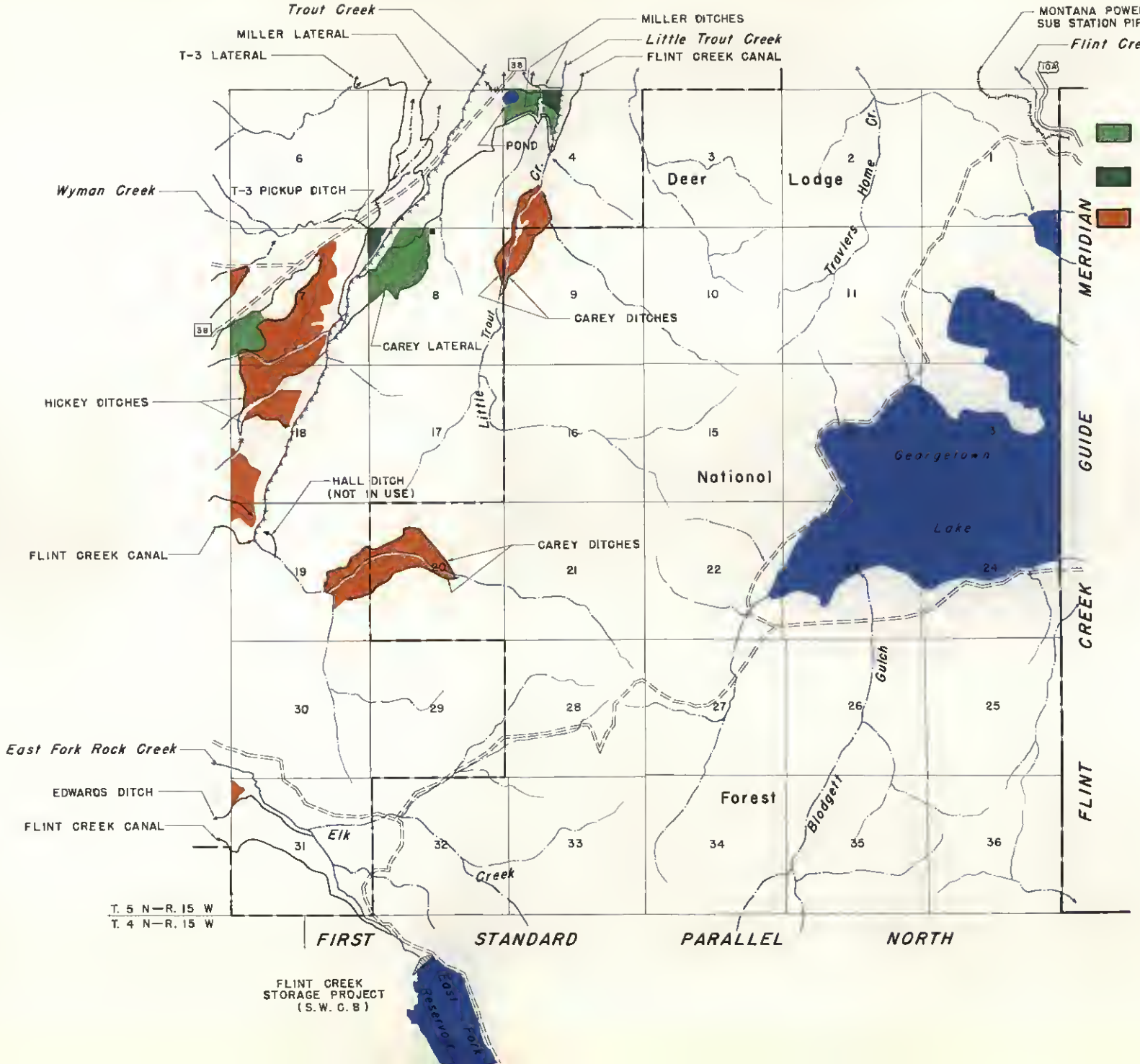


LEGEND

Private Irrigation


Twp. 4 8 5 NORTH
Rge. 16 WEST
LEGEND
Private Irrigation
Beaver or Showers Creek
Moukey Creek
Deer
Lodge
Showers Creek
Beaver Cr.
GILSTRAP DITCH
Mt. Emerine
KENNEDY DITCH
STEVENS DITCH
May Cr.
Koye Cr.
Ross Fork Rock Creek
MILO DITCH
Notional
RUPP DITCHES
Gilstrap Cr.
RUSSELL DITCH
HILL LATERAL
BARR DITCHES
Milo Lake
Angelico Cr.
KAIZER DITCH
Beaver Creek
CHRISTENSEN DITCHES
LYON DITCHES
FORSEMAN DITCHES
Elk Creek
BEAVER PONDS
Forest
T. 5 N—R. 17 W
T. 4 N—R. 17 W
Ross Fork Rock Creek
SMITH DITCHES
BEAVER PONDS
Moose Meadows Creek

Twp. 5 NORTH
Rge. 14 WEST



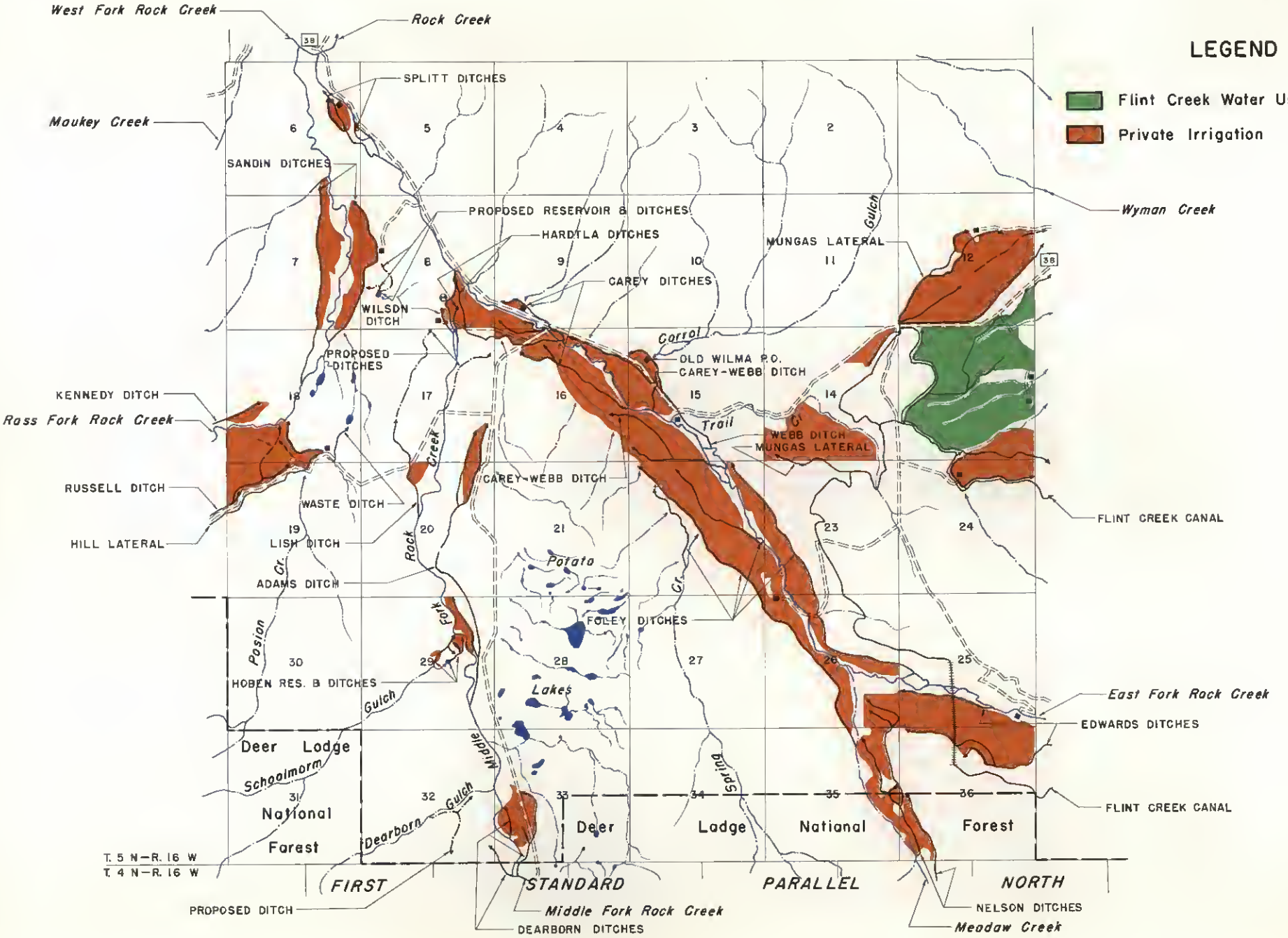
LEGEND

- Flint Creek Water Users Ass'n.
- Flint Creek Water Users Ass'n. & Private Irrigation
- Privote Irrigation

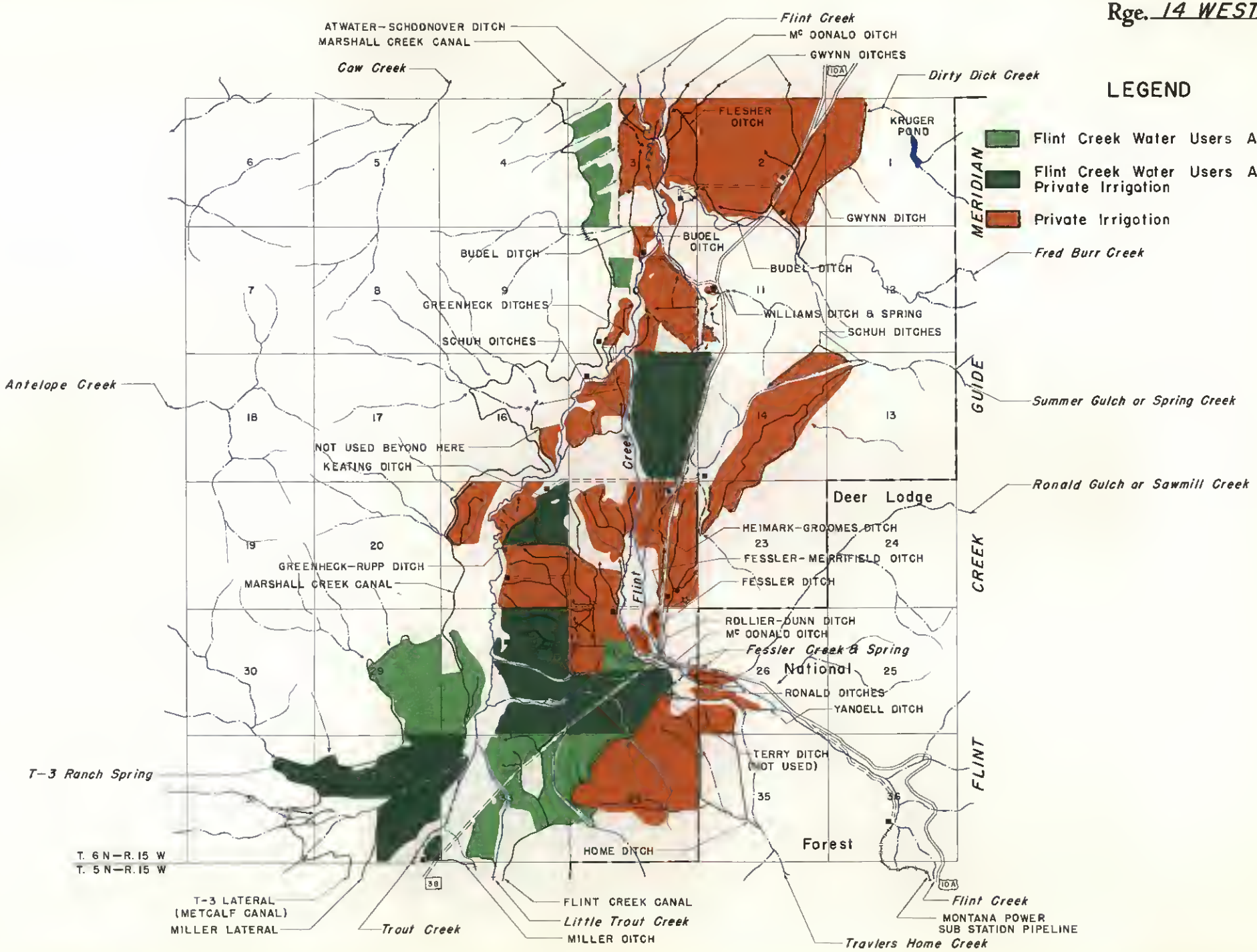
DEER LODGE

COUNTY

Twp. 5 NORTH
Rge. 15 WEST



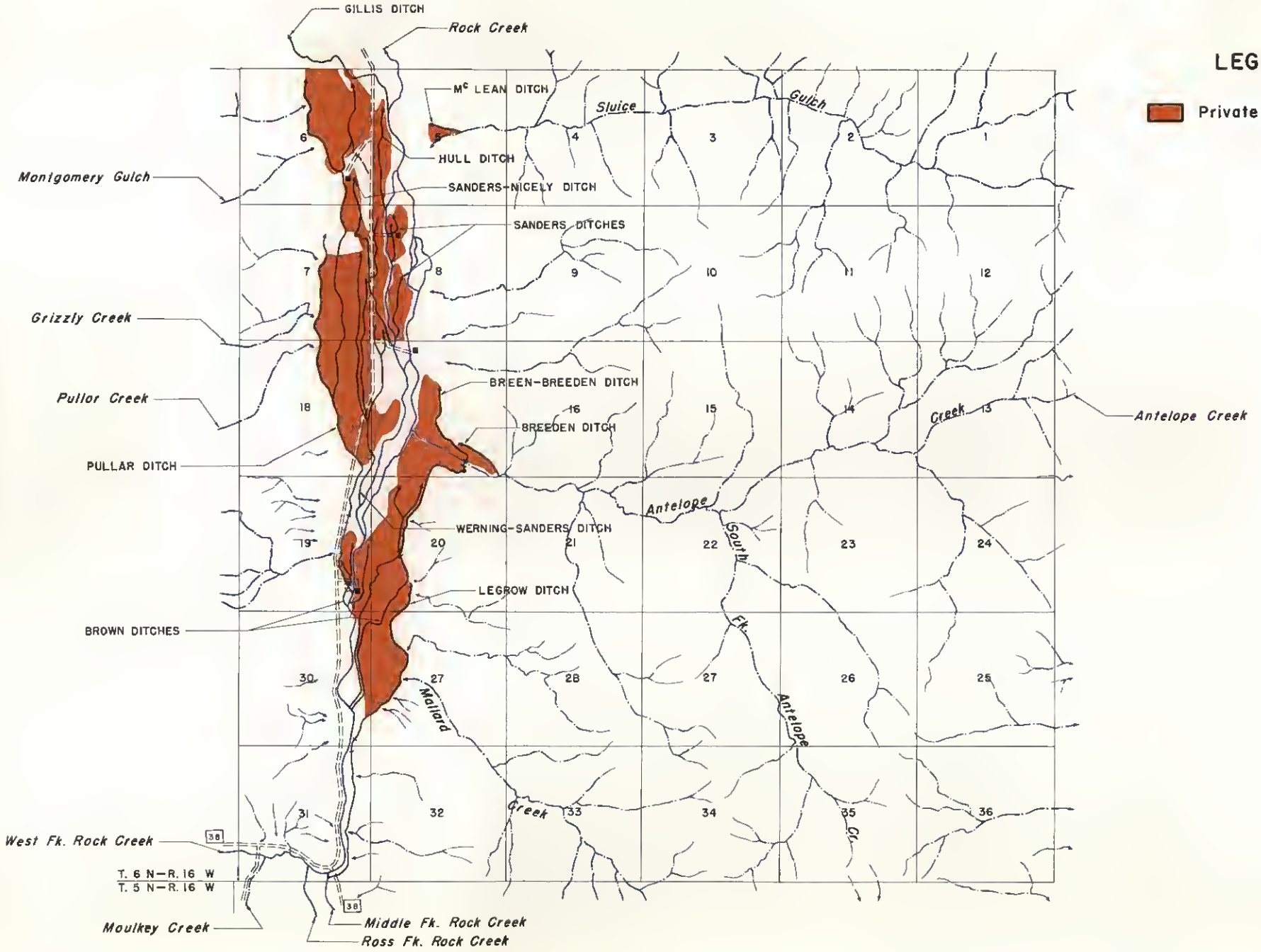
Twp. 6 NORTH
Rge. 14 WEST



LEGEND

- Flint Creek Water Users Ass'n.
- Flint Creek Water Users Ass'n & Private Irrigation
- Private Irrigation

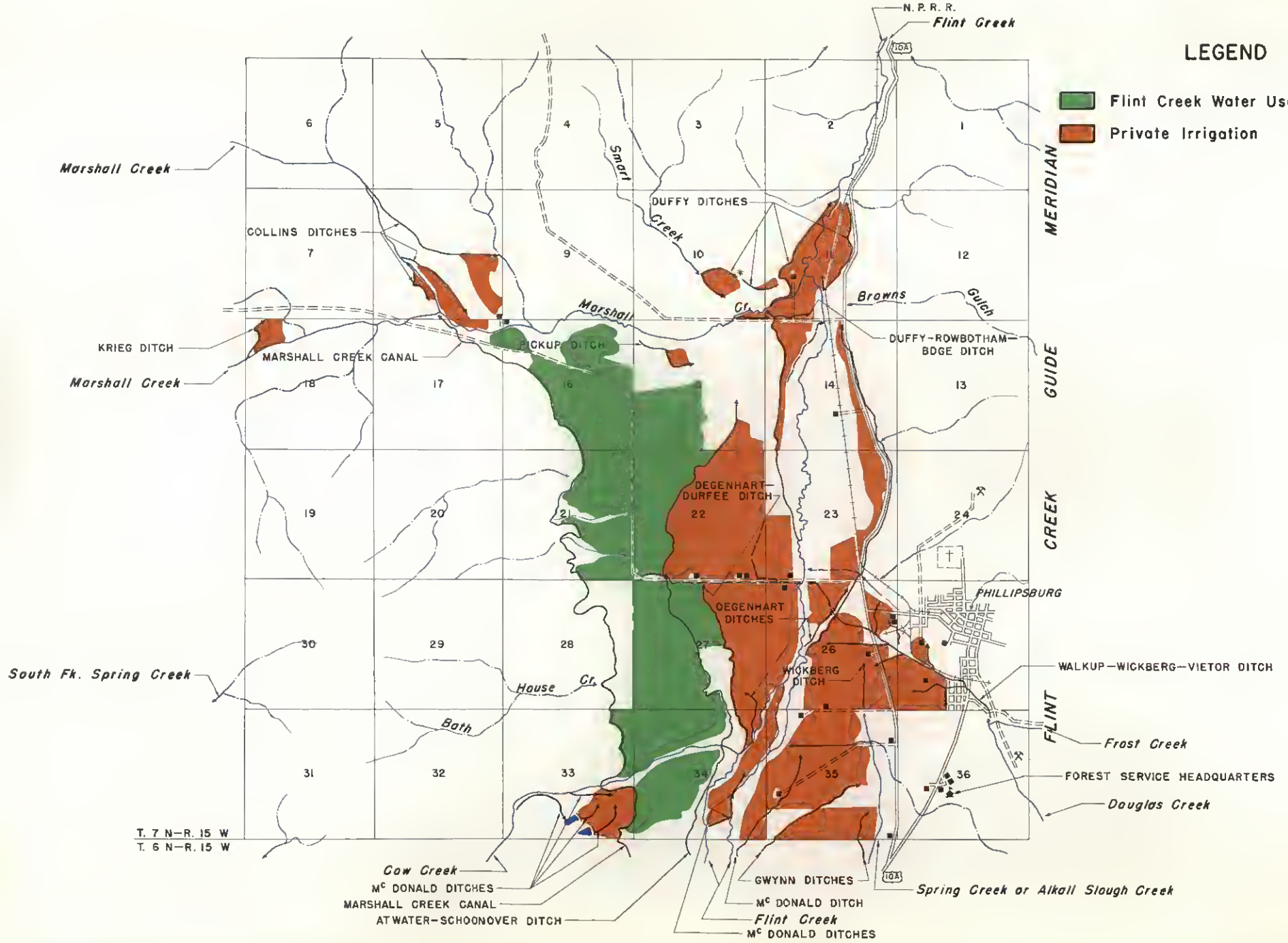
Twp. 6 NORTH
Rge. 15 WEST



LEGEND

Private Irrigation

Twp. 7 NORTH
Rge. 14 WEST



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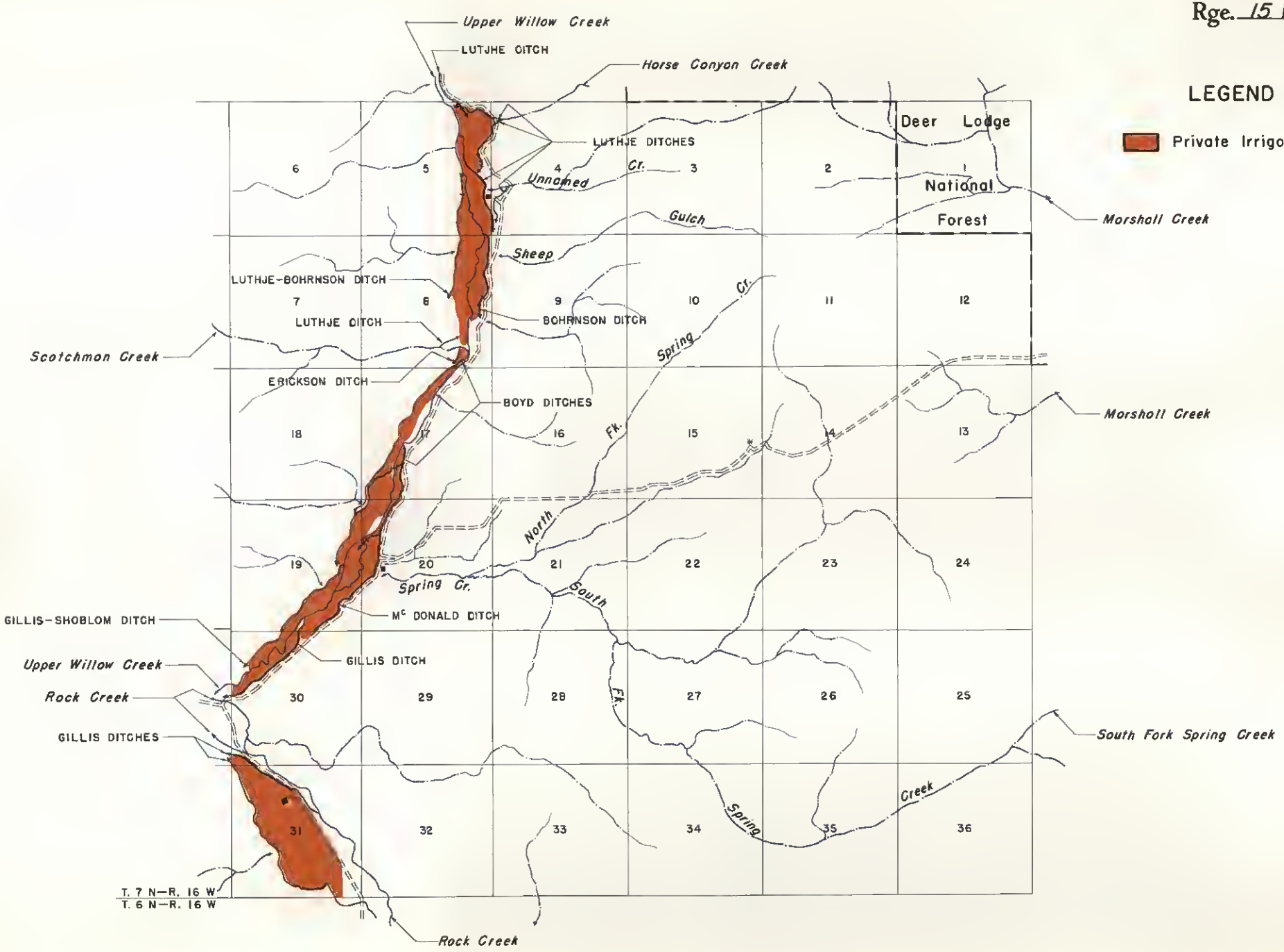
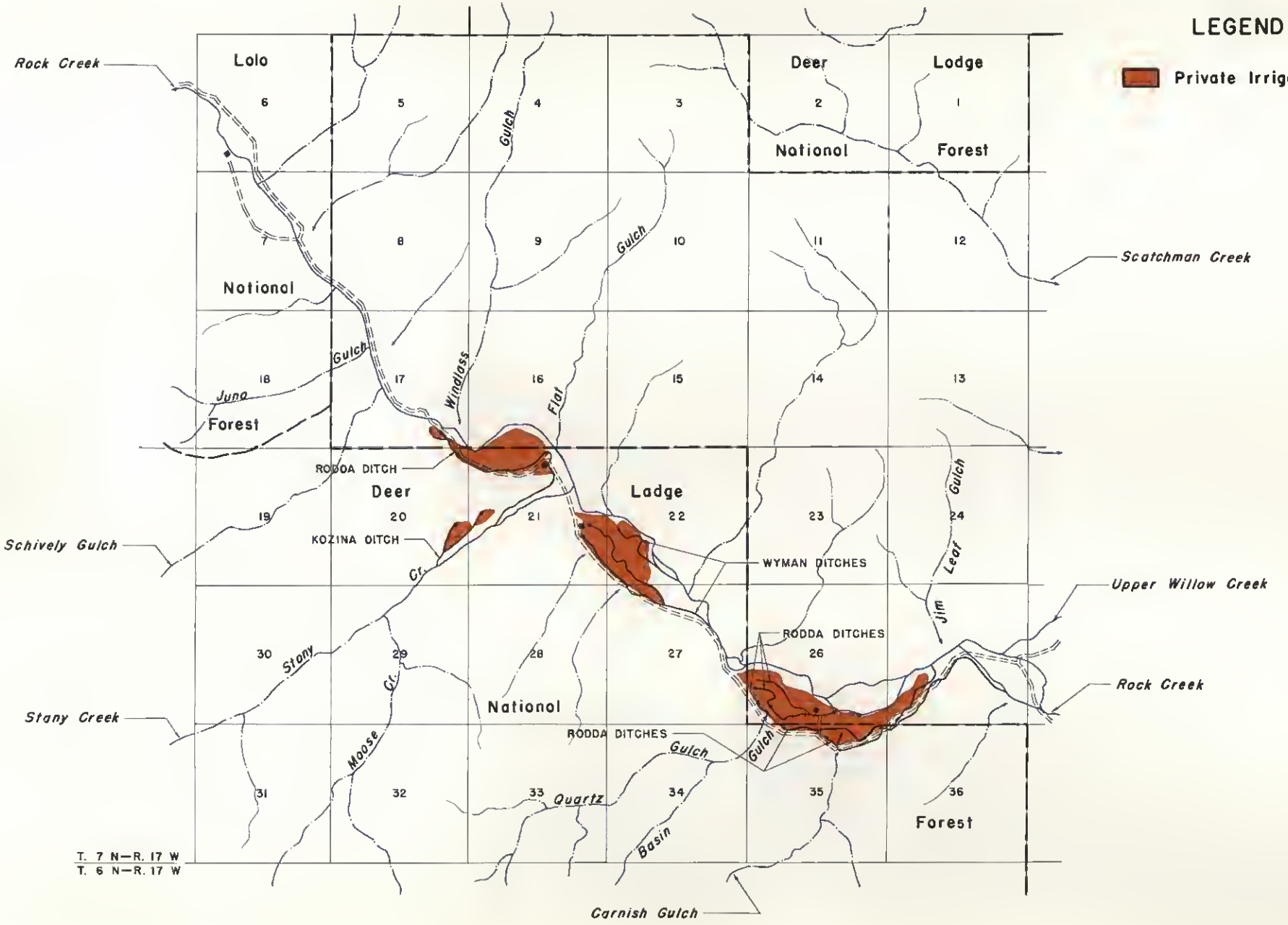
Rge. 15 WEST



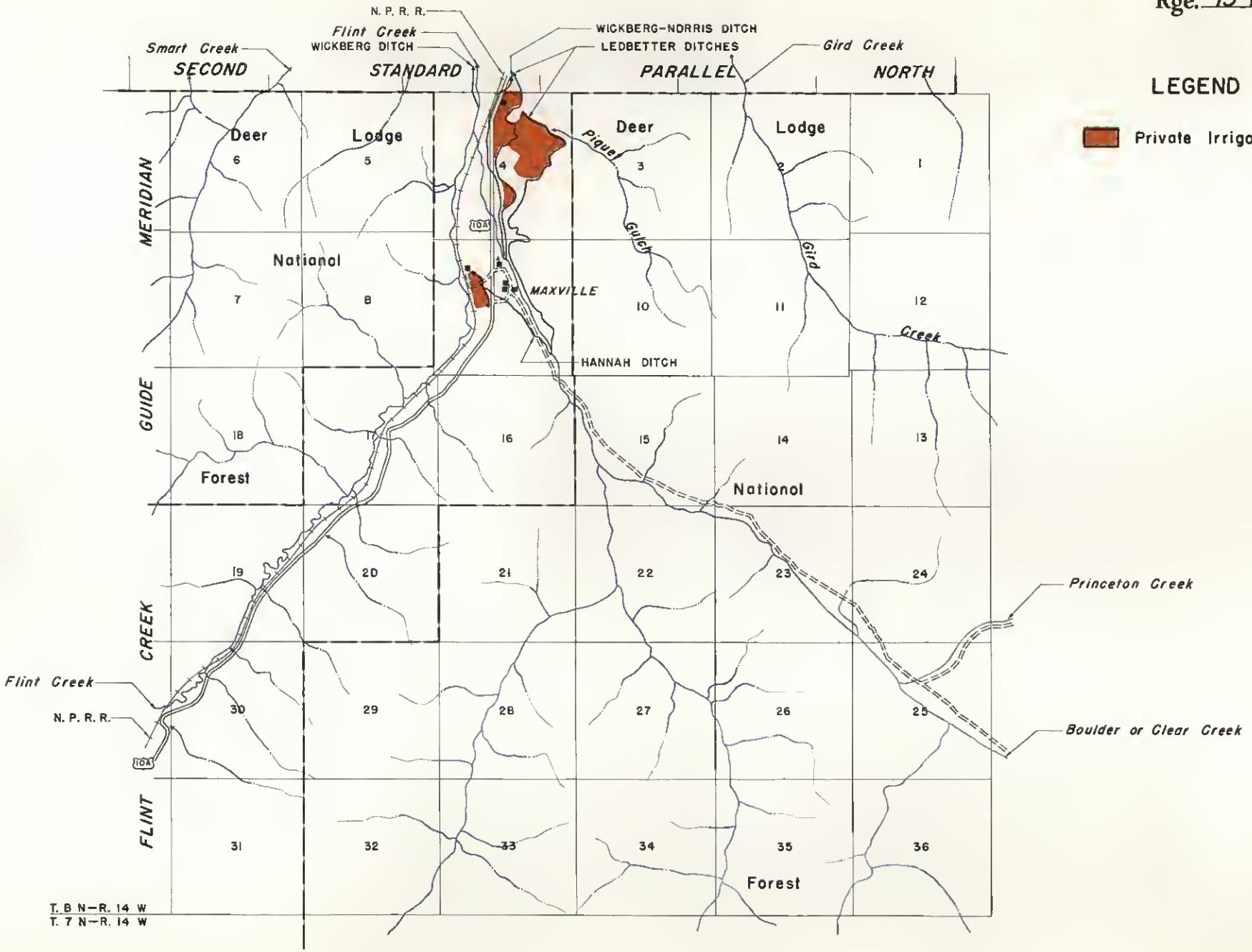
LEGEND

Private Irrigation

Twp. 7 NORTH
Rge. 16 WEST



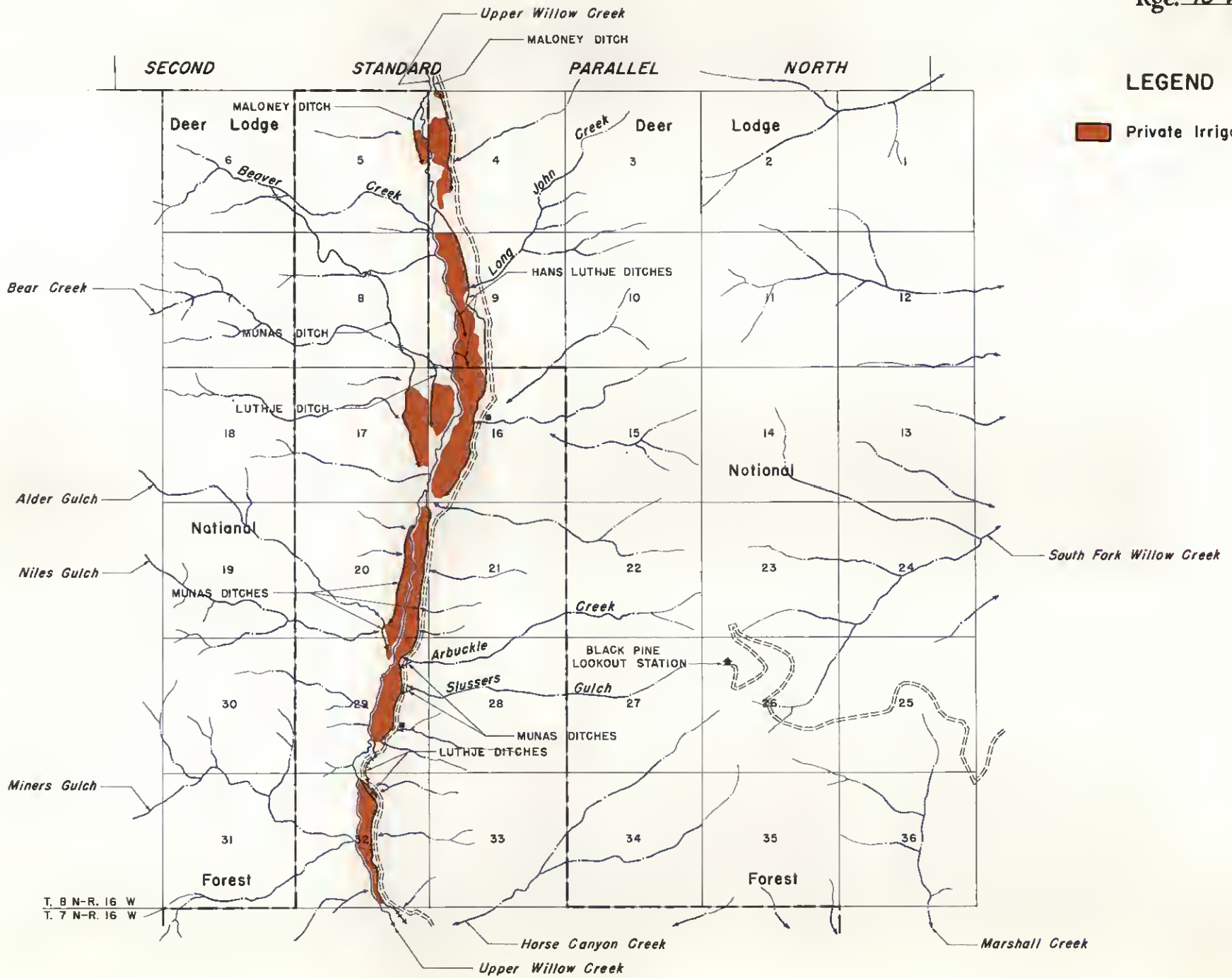
Twp. 8 NORTH
Rge. 13 WEST



LEGEND

Private Irrigation

Twp. 8 NORTH
Rge. 15 WEST



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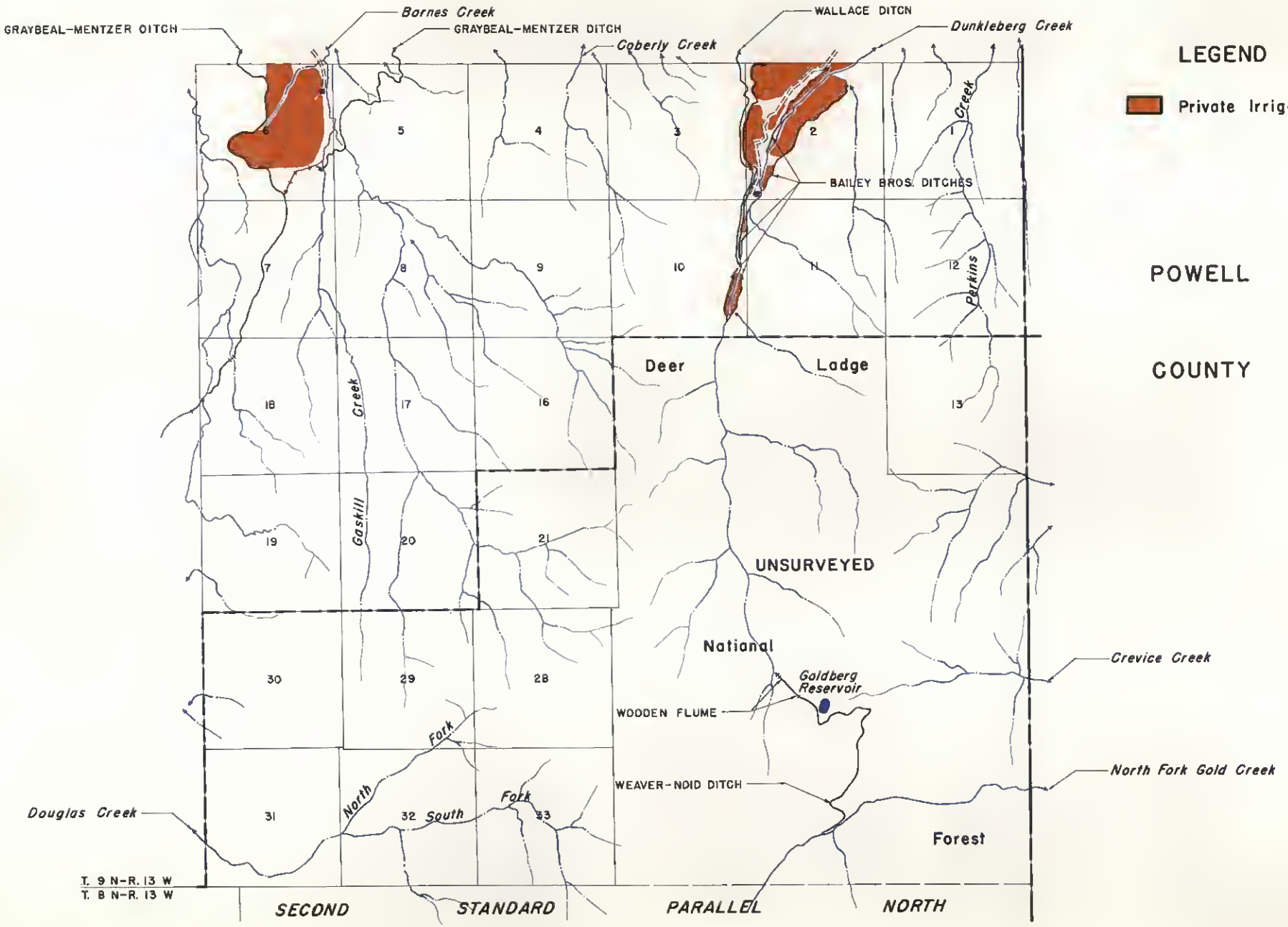
Rge. 12 WEST



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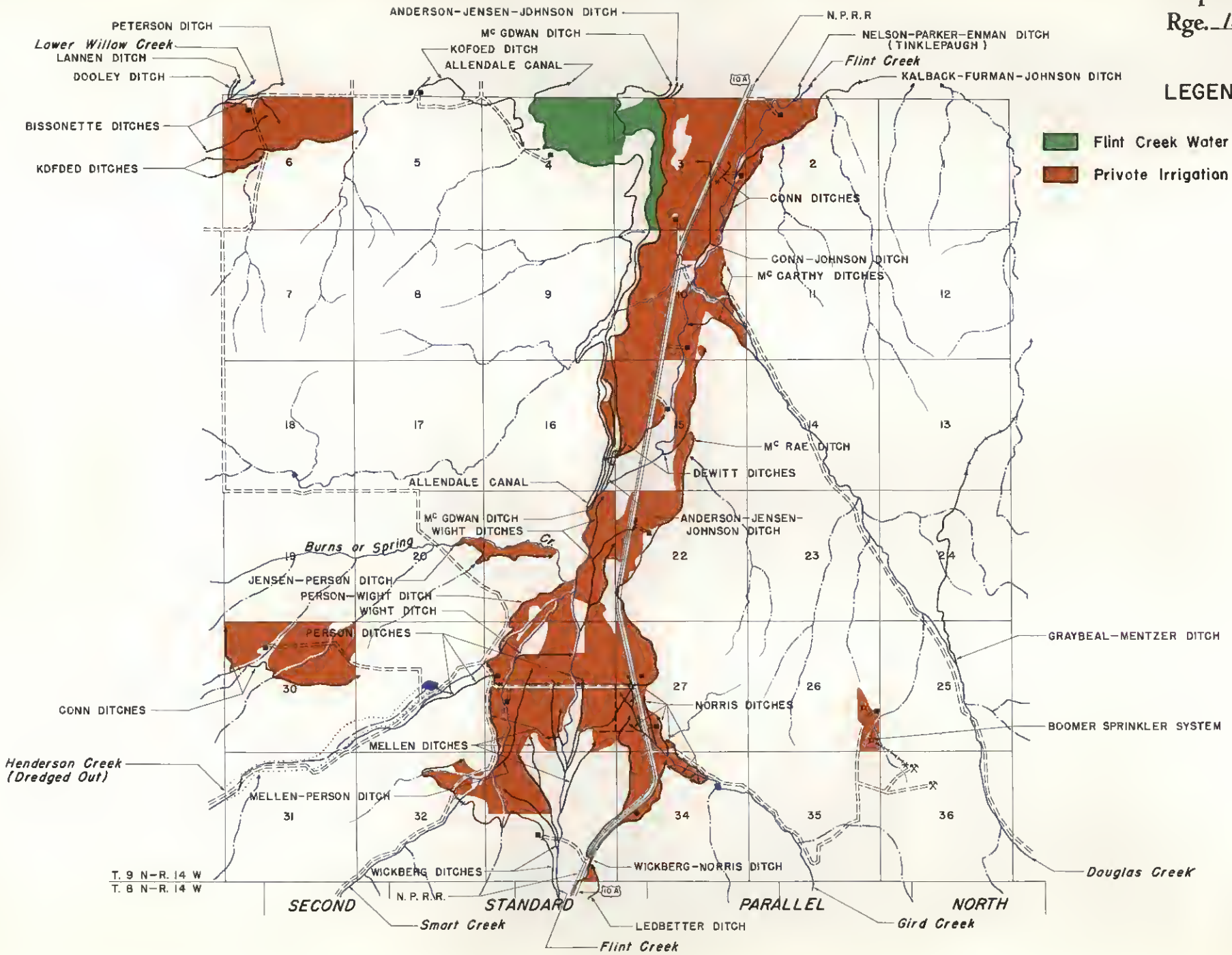
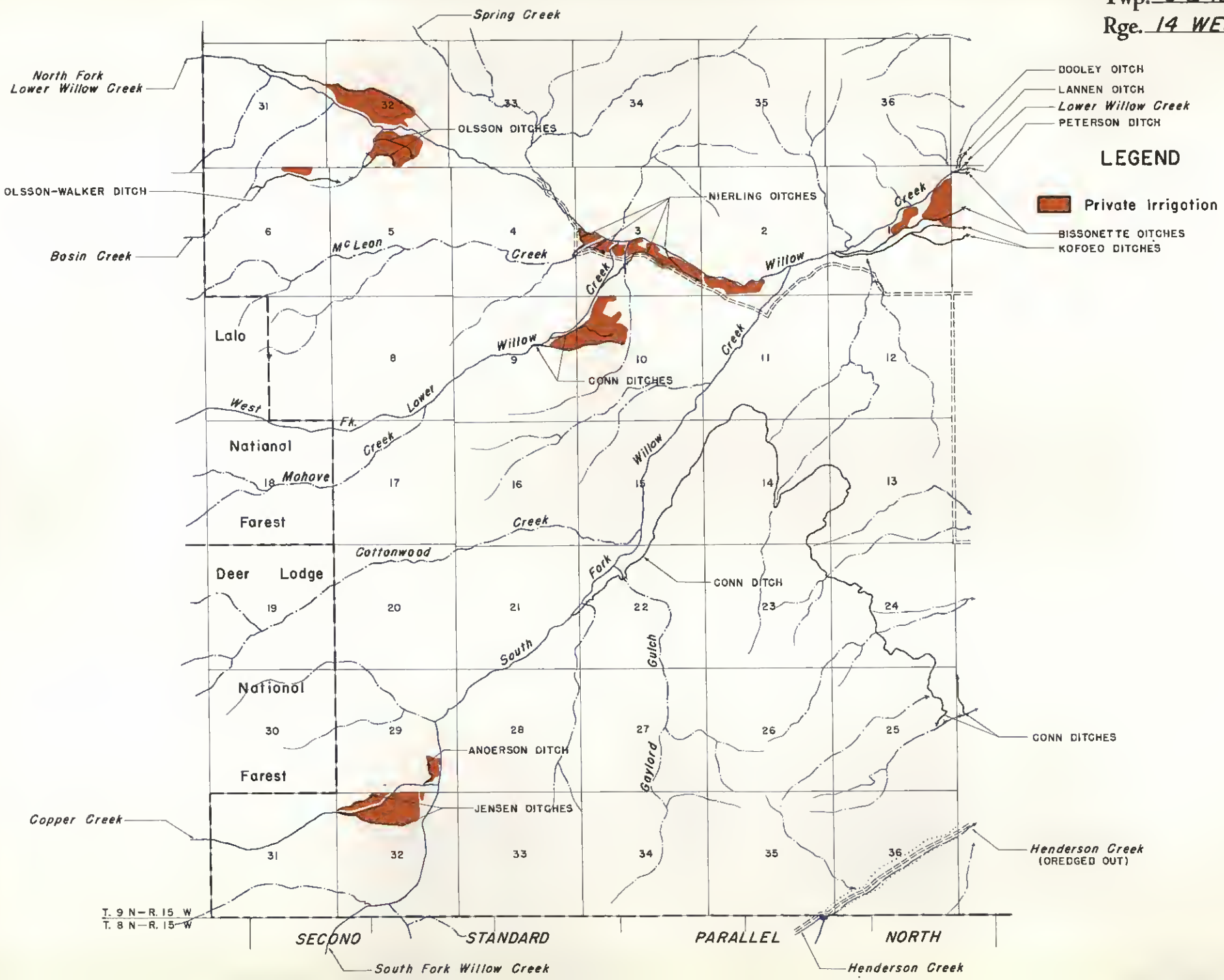
Rge. 13 WEST



LEGEND

- Flint Creek Water Users Ass'n
- Private Irrigation

Twp. 9 & 10 NORTH
Rge. 14 WEST



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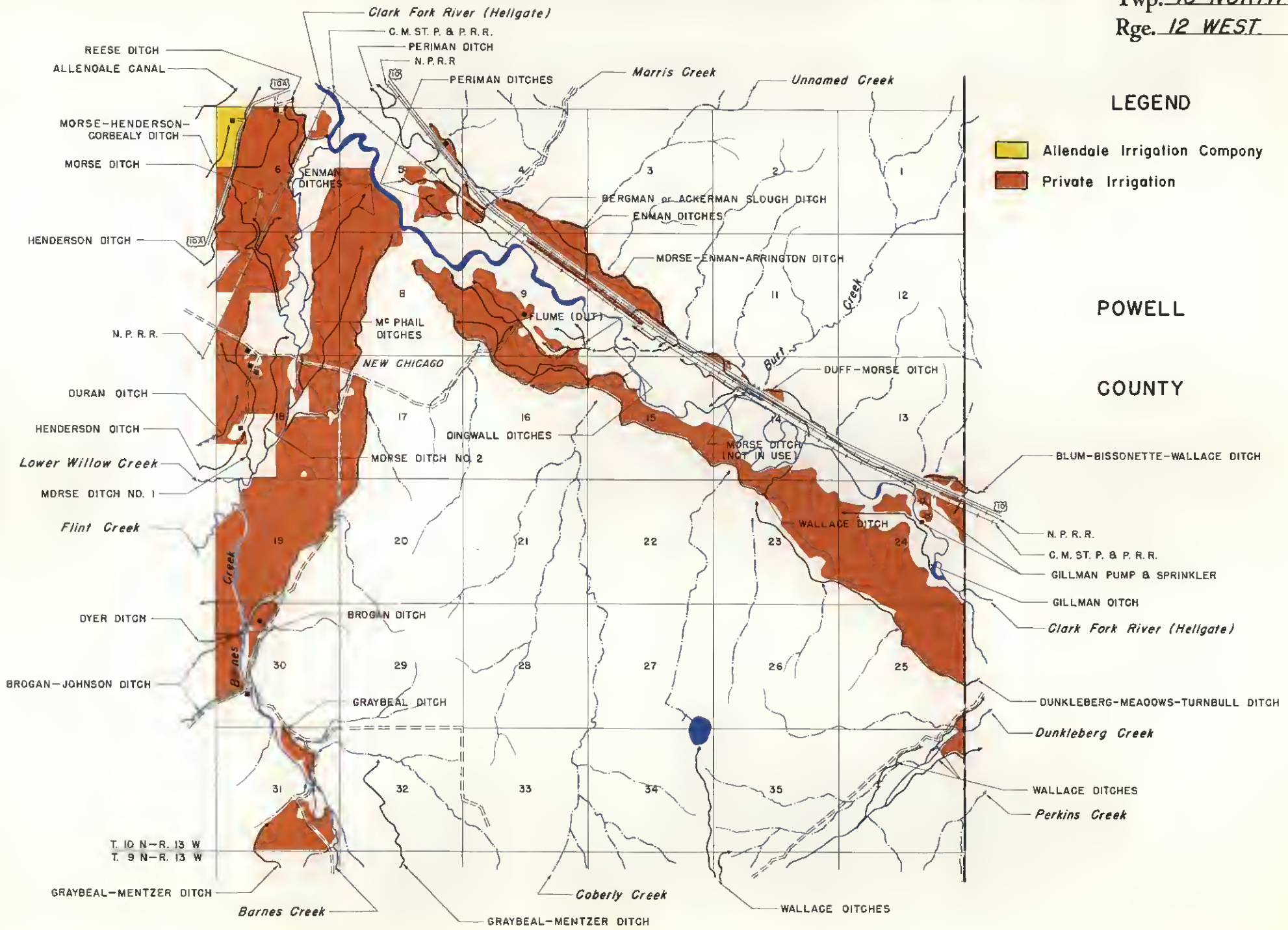

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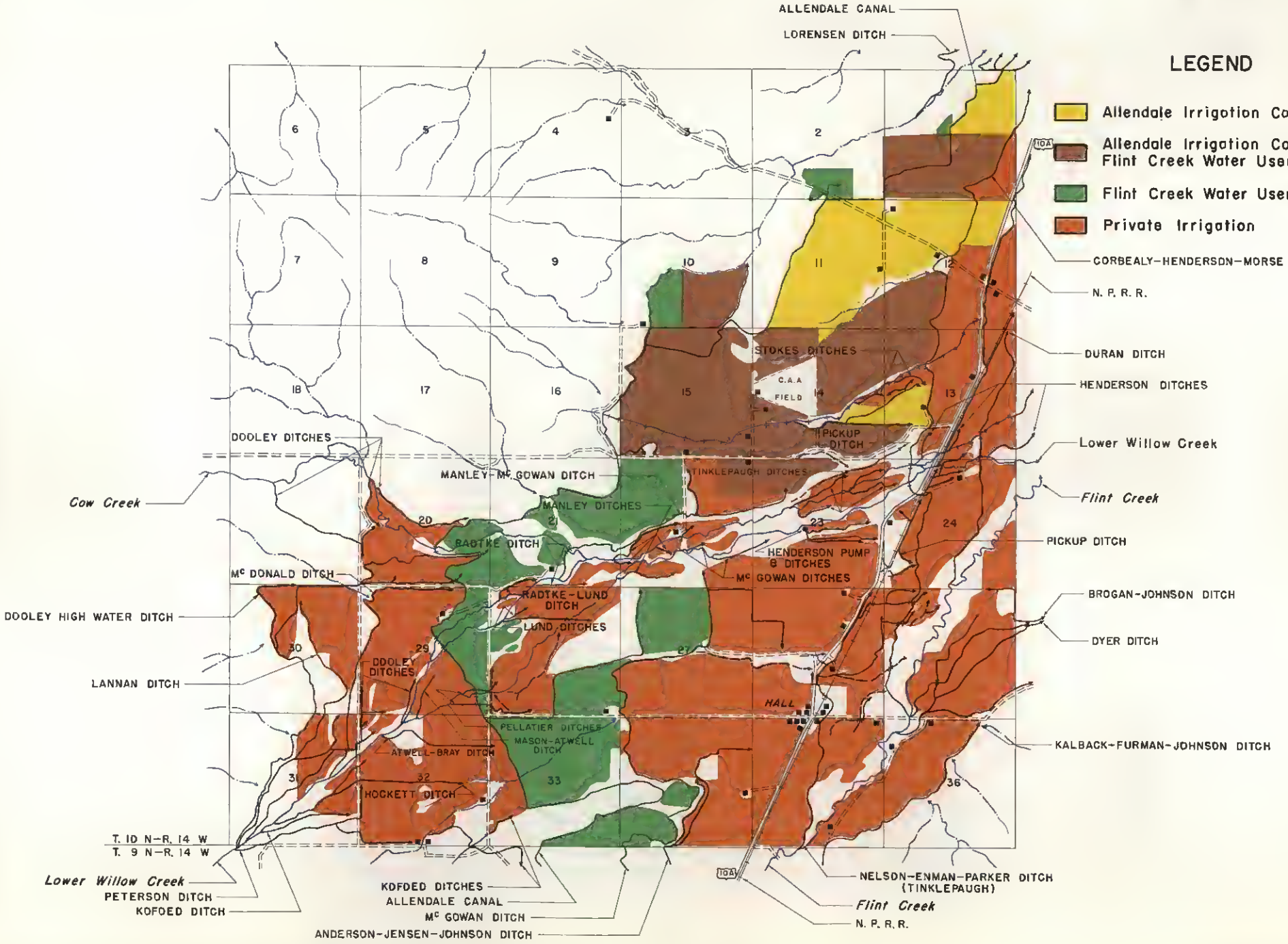
Rge. 13 WEST



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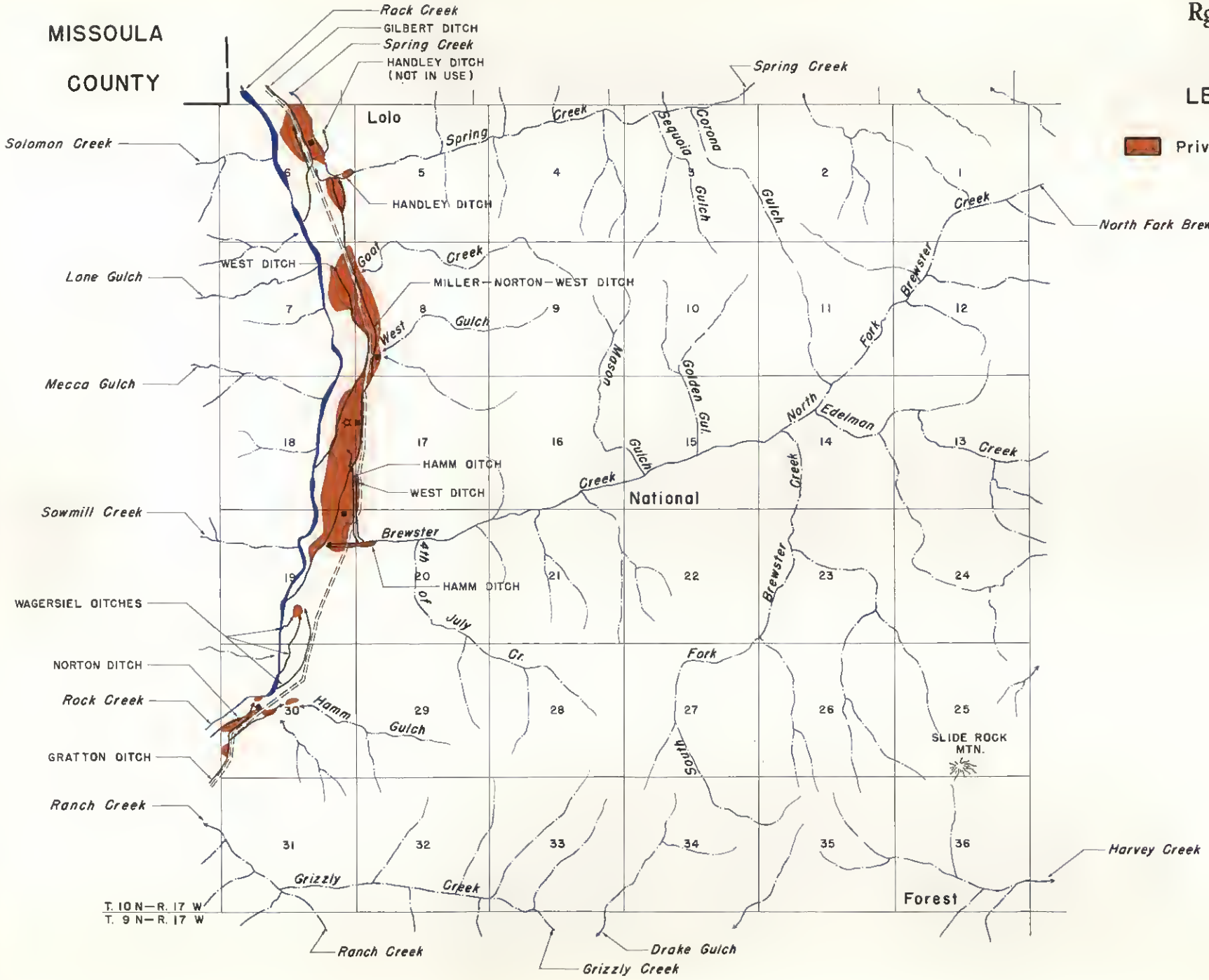

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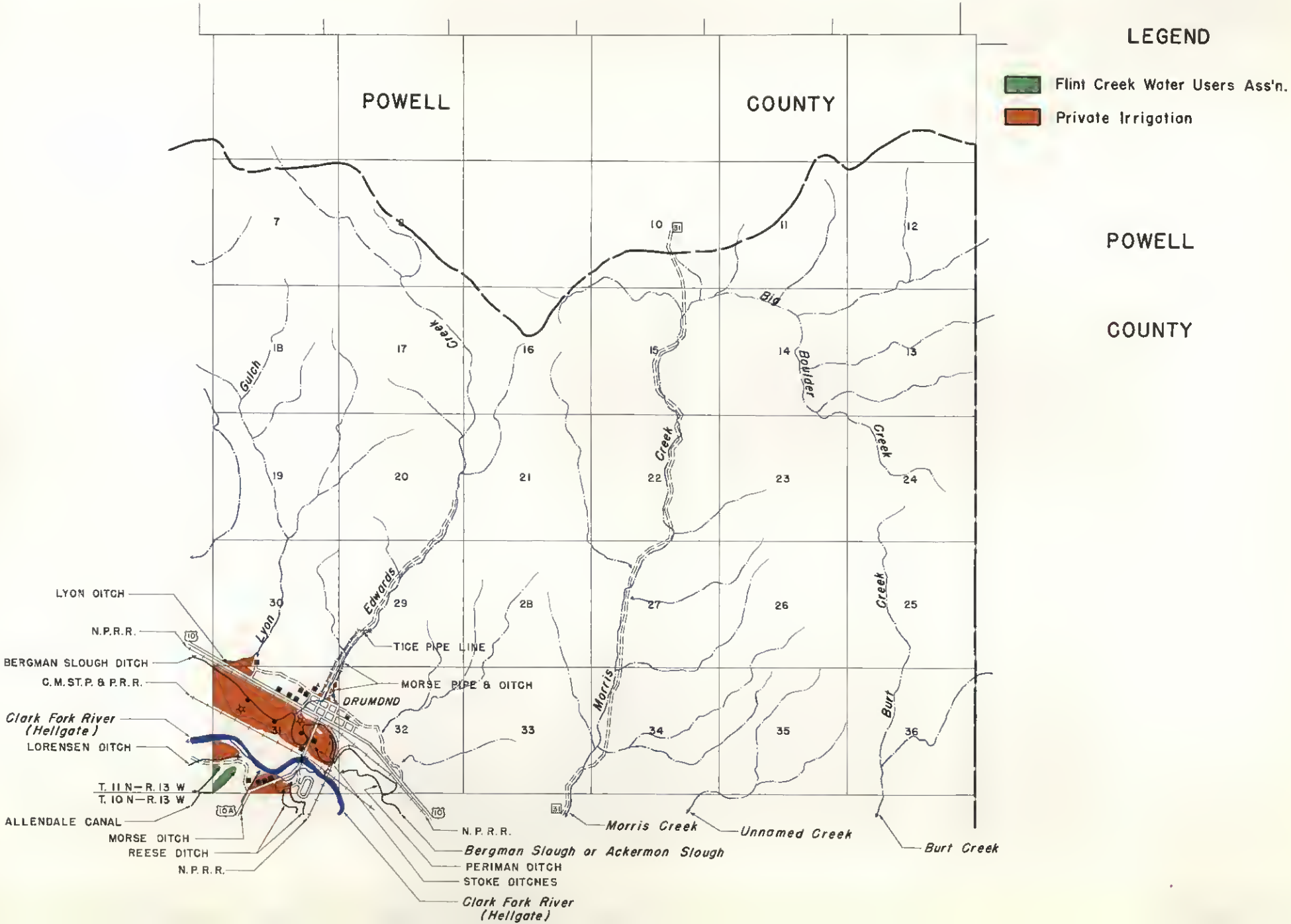
Rge. 12 WEST



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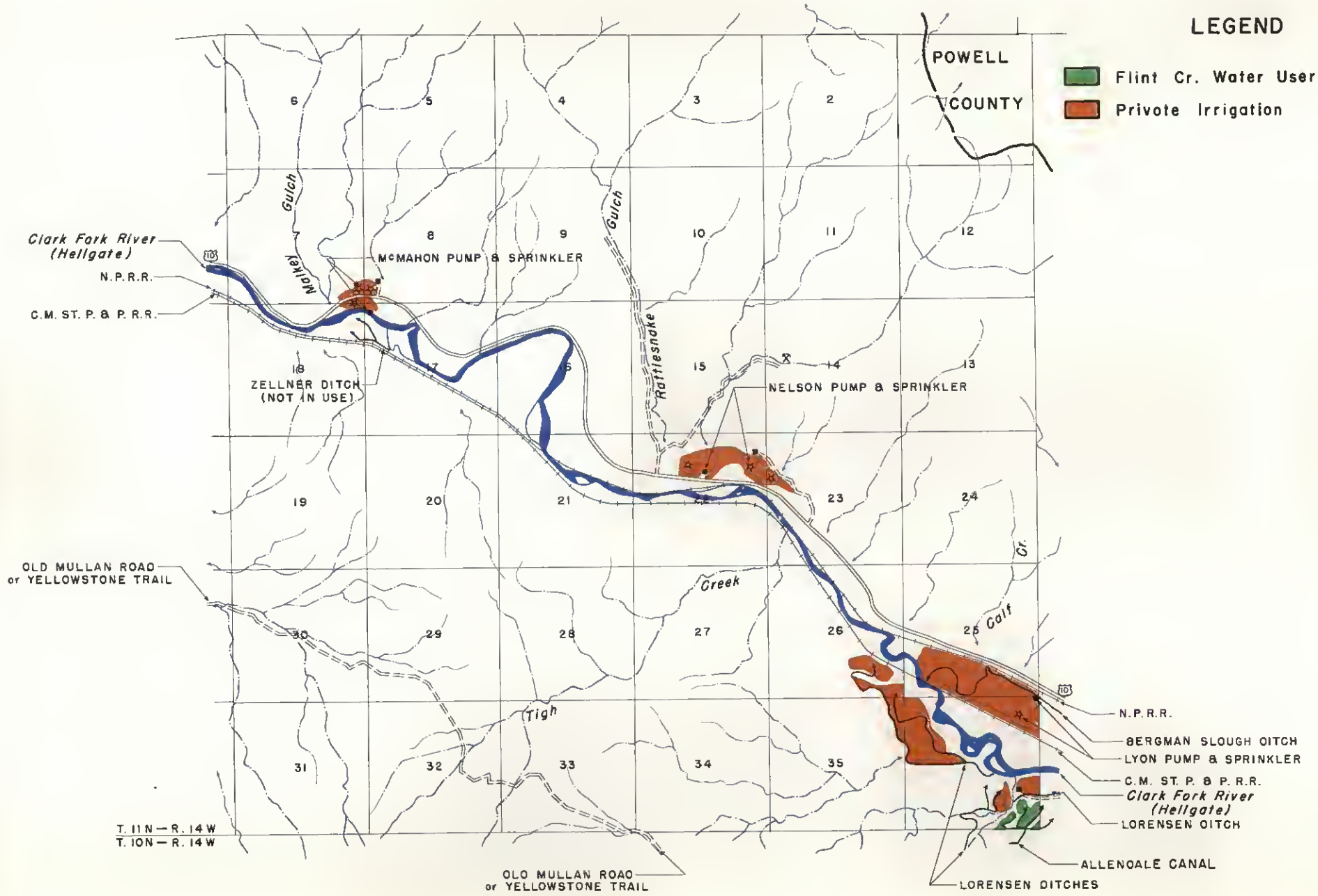

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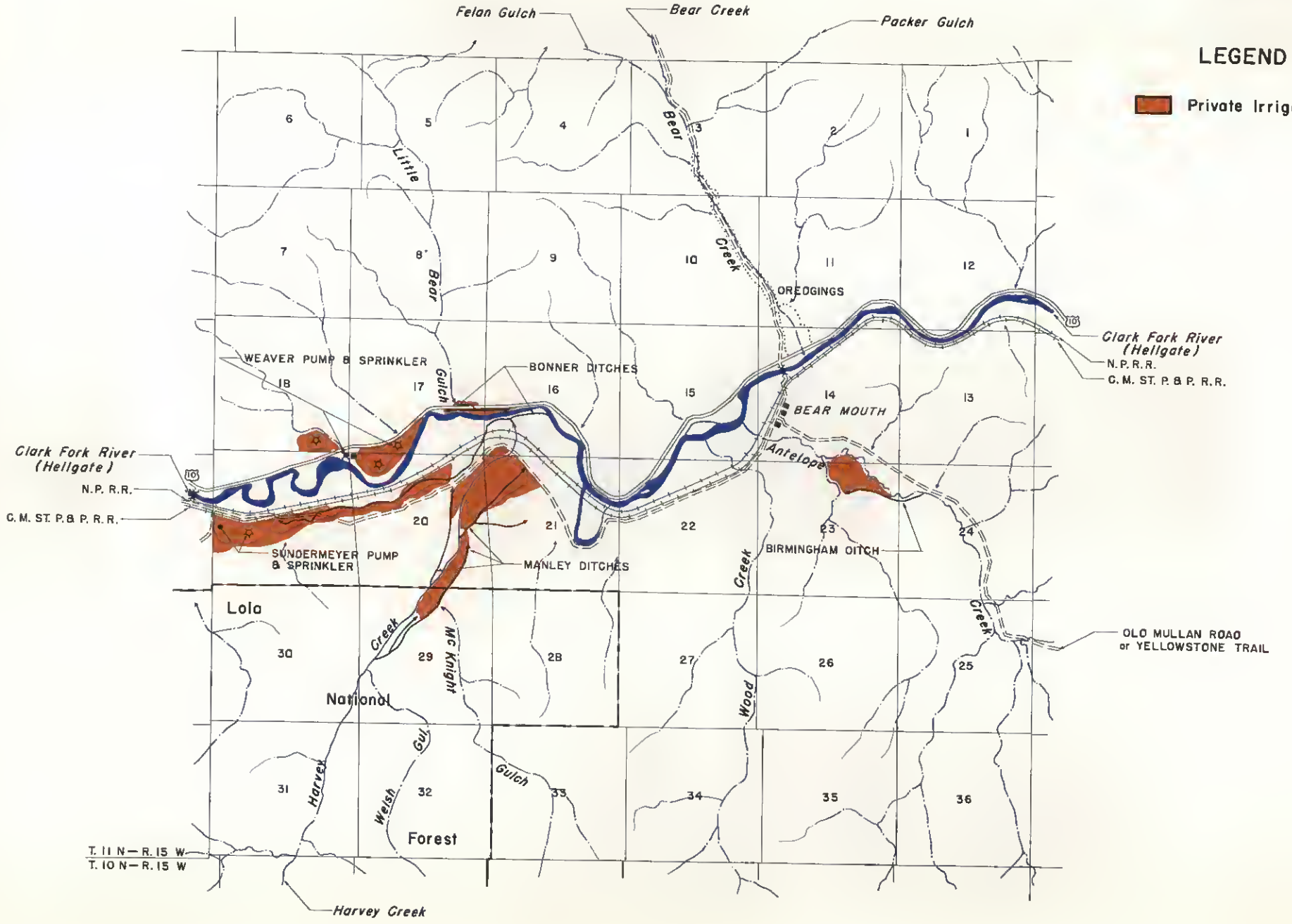
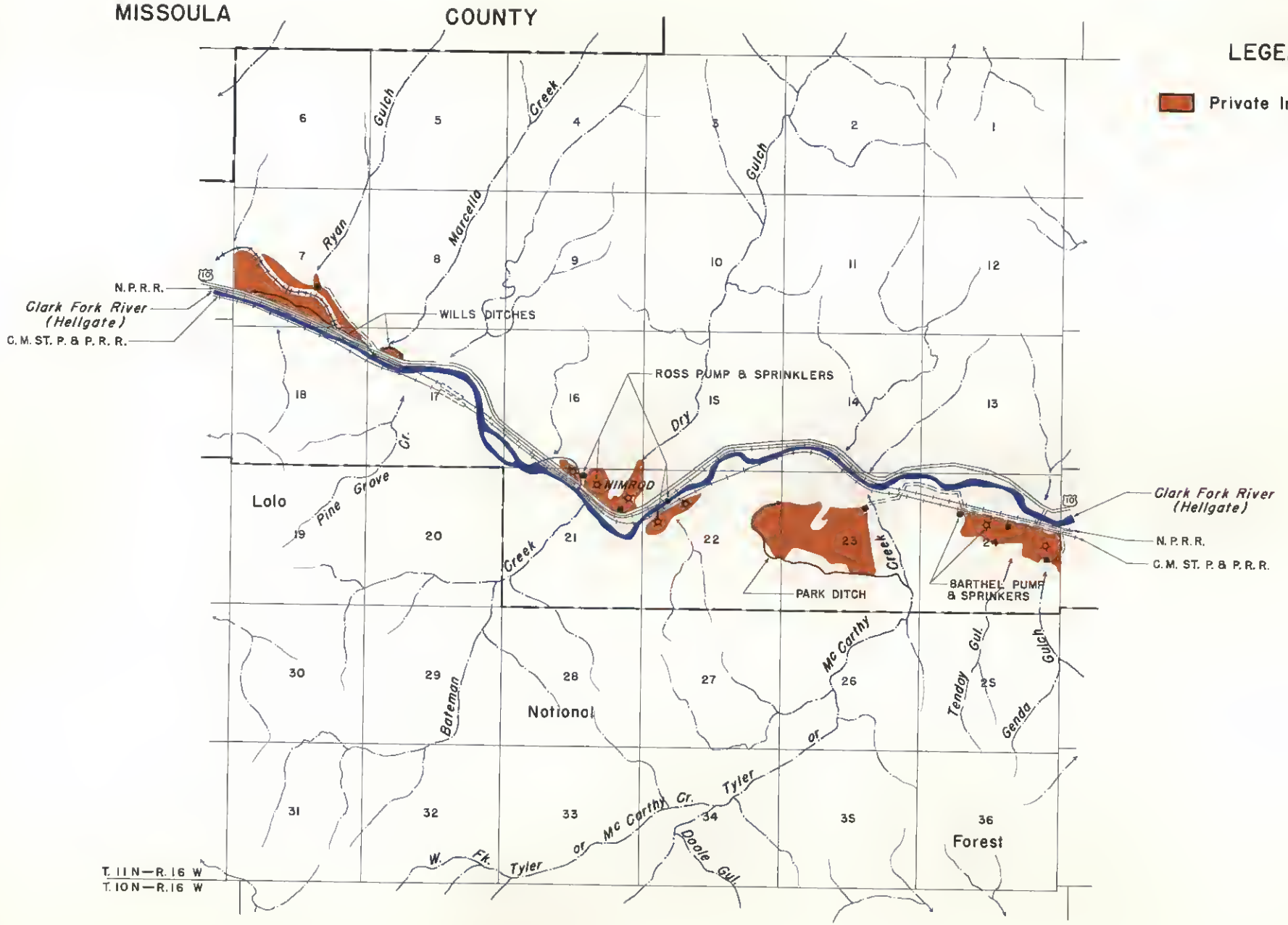


LEGEND

Private Irrigation

Twp. 11 NORTH
Rge. 15 WEST



Twp. 11 NORTH
Rge. 16 WEST